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VOL. V.---NO. 8. NEW YORK, AUGUST 24, 1861. NEW SERIES

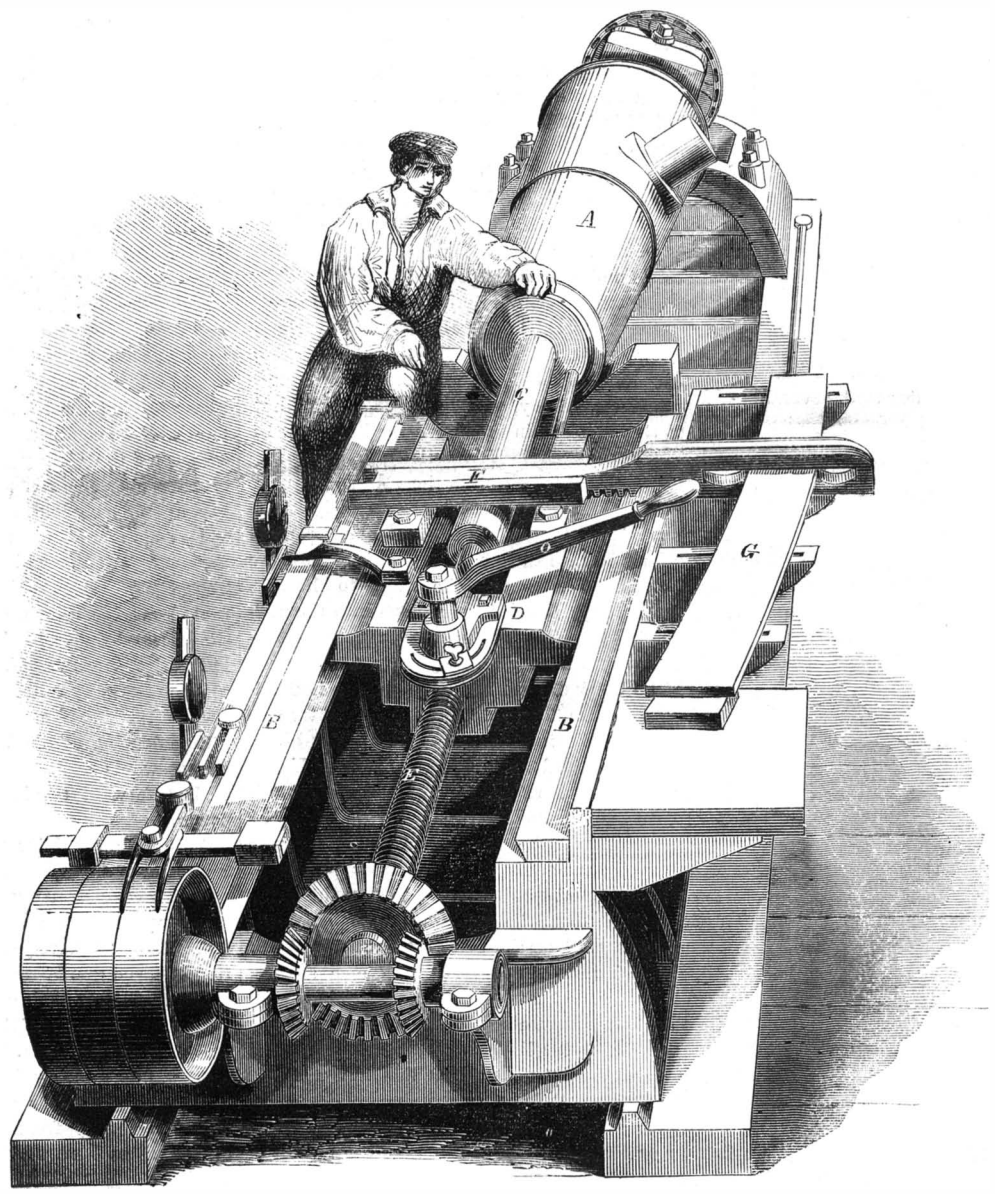
Rifling United States Cannon.

We here give an illustration of the process of rifling cannon which is now going on at Governor's Island, in this harbor. A large number of the ordinary cast iron service guns are being rifled to adapt them to James's projectile, or any of the others which have expanding rings of soft metal. At the time our engraving was made an 18-pounder gun was on the machine undergoing the rifling process. Guns of various sizes have been rifled, 42, 32, 24 and 18-pounders, and those of 12 and 6-pound size are to be. In all guns larger than 6-pounders, 18 grooves are cut to a depth of one-sixteenth of an inch at the edge and one-twelfth in the middle; the grooves being four one-hundredths of an inch wider than the lands.

The machine with which the rifling is done is very simple. The gun, A, is firmly secured in the machine with its axis parallel with the ways, B B. The outer end of the cylinder, C, which carries the cutting tool is attached to a block, D, that slides between the ways, being carried back and forth by the worm, E. The tool cuts only during its outward passage, and the spiral direction is given to the curve by turning the cylinder, C, upon its axis as it is drawn outward. This turning of the cylinder is effected by a very simple arrangement. A pinion is keyed upon it and connected with gears which mesh into the straight rack, F. The rack, F, embraces the curved plate or bar, G, which consequently imparts a motion to the rack at right angles to the machine, and thus turns the pinion upon the cylinder, C. It will thus be seen that any twist desired may be given to the riflings by simply giving a corresponding form to the edges of the plate, G.

The cylinder, C, is hollow and a rod passes through its axis, upon which the cutting tool is secured.—This rod is turned at each passage of the cylinder to feed the cutter to its work. The gun is turned from one groove to the next by a disk attached to the breech. H H are the belt shifters to reverse the motion of the cylinder, C, at each passage.

The cannon at Governor's Island are being rifled with an irregular spiral or "gain twist," so that they will be adapted only to projectiles with soft bands. A considerable number of James's projectiles have been sent with rifled cannon to Fort Pickens.



RIFLING CANNON.

Cyanide of Potassium for Soldering.

"As the result of a great number of experiments," says Dr. Augustus Vogel, "I have come to the conclusion that the ordinary cyanide of potassium possesses advantages over all other substances for soldering. It melts readily covering the face of the metal to be soldered with an efficient protective layer, and at the same time it exerts a strong reducing action, a property which has gained for it many important applications in analytical chemistry. Cyanide of potassium, as a solder, will be found particularly useful when the surfaces cannot be brightened. It is difficult to solder metals when their surfaces are corroded, but cyanide of potassium is able to deoxydize all rusty spots to permit the solder to close the joints."

The mode of applying the cyanide of potassium is in the form of a powder. It is kept at hand in a closed glass bottle, and sprinkled over the metallic surface to be soldered, after it has been slightly moistened. A mixture of one half borax and one half cyanide in powder is best when the heat to be applied to melt the solder is very high. It will be understood that this agent is to be used with solder in the same manner as powdered resin is employed by tinsmiths. For common soldering with very hard solders, a compound of borax, potash and table salt, fused together and reduced to powder, is employed. Various other substances, such as salammoniac, borax, &c., are sometimes used, but Dr. Vogel believes the cyanuret of potassium superior to them all.

Machinery for Gun-Making.

The increased necessity for implements of war and for army supplies of various kinds is furnishing employment to large numbers of mechanics and operatives. Few of our mechanists now complain of lack of work. The demand for small arms is such that the necessity for machinery for their manufacture is calling into requisition the resources of all our first-class machine shops. In the manufacture of muskets, rifles and pistols, hand labor is almost entirely dispensed with, and machines of delicate construction and remarkable effectiveness are now within the reach of manufacturers. Nearly the entire works of Messrs. Bement & Dougherty of this city are devoted to the production of this machinery. When we remember that this machinery is itself largely made by the aid of other and more ponderous machinery, it will be seen that the preparations for the war are being carried on upon a stupendous scale, and that the Federal government must soon be armed in a manner that will place it upon a footing with any nation in the world. In addition to the work for this government, however, the same firm are making machinery to a large extent for the Spanish government. It is a fact that in the manufacture of gun machinery Philadelphia excels the world, and the reception of extensive orders from European governments is a tangible recognition of the fact. The main machines used in gun-making are milling, edging and rifling apparatus, but, all told, the various operations required to complete a gun are almost incredible.

[The above is from the *United States Gazette*. The machinery used in the Enfield rifle manufactory, belonging to the British government, was mostly built, we believe, at Springfield, Mass., and superintended by Mr. Burton, of Harper's Ferry Armory.—Eds.

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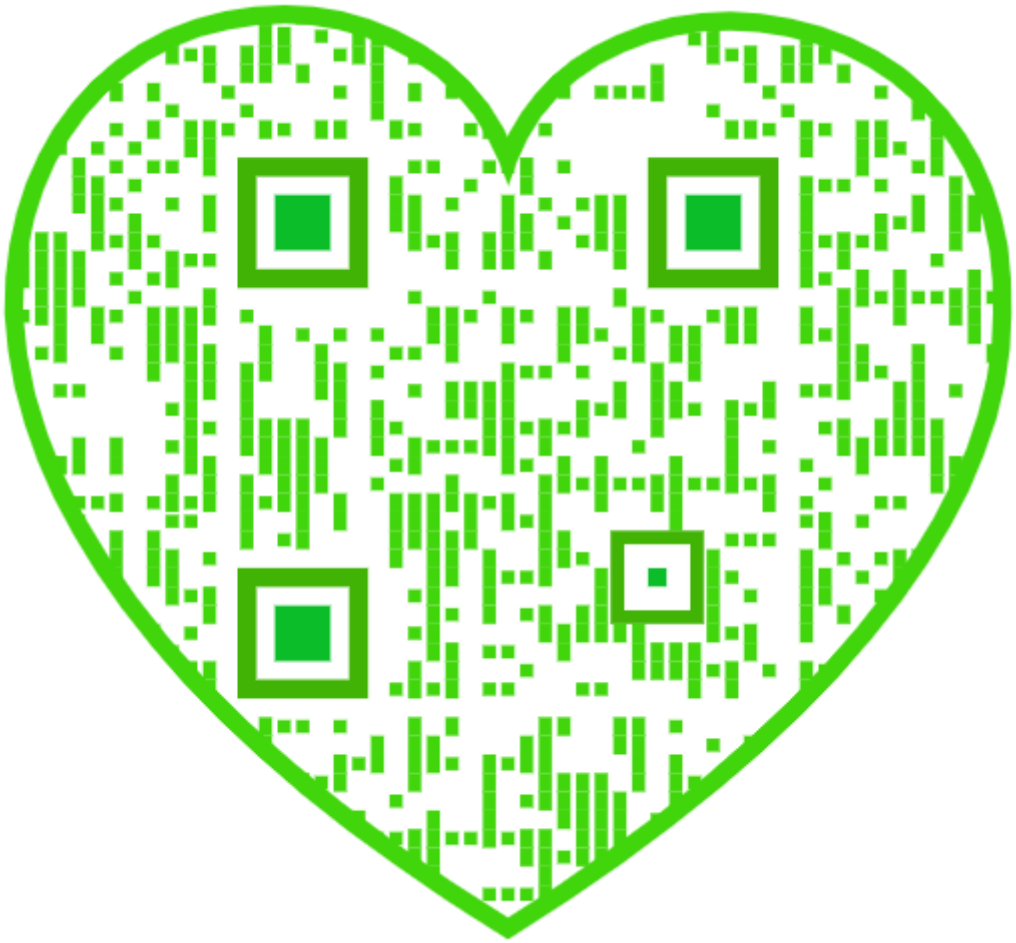

THE WAR.

SINKING A PRIVATEER.

Among the vessels employed in the blockade of Charleston is the frigate *St. Lawrence*, a sailing vessel of 50 guns. Her commander, Captain Purviance, has been in the practice of keeping her portholes closed and her crew out of sight, in order that the privateers might mistake her for a merchant vessel, and thus be induced to approach within reach of her guns. On the 29th of July, a beautiful craft, formerly a United States revenue cutter, was seen coming toward her with the secession flag flying. The *St. Lawrence* sailed away, and the privateer gave chase. When the latter came within hailing distance, the captain ordered the frigate to heave to and send a boat aboard. No reply being given, three shots were fired by the privateer—two round shot and one charge of grape. Both of the round shot struck the *St. Lawrence*, but without doing material injury, and the grape passed over the heads of the officers who were standing on the quarter deck. The frigate then opened her portholes, and poured a broadside into the privateer, smashing her to pieces, and sinking her almost instantly. Out of her crew of forty men, four were lost, and the remaining thirty-six were picked up by the boats of the *St. Lawrence*. They were sent to Philadelphia, and are now in the Moyamensing prison in that city.

The privateer was called the *Petrel*. She was formerly the United States revenue cutter *Aiken*, and was seized in the beginning of the rebellion by the secessionists of South Carolina. Her captain is a North Carolinian of the name of Perry.

Vessels are almost daily arriving in some of our ports which have been taken by privateers and recaptured by our naval vessels.

BURNING OF HAMPTON.

During the night of August 7–8th, the village of Hampton, in Virginia, was burned by the secessionists. Hampton was one of the oldest places in the country, having been settled in 1610. It was a village of about 500 houses, and before the secession troubles, contained about 2,000 inhabitants. At the time of its destruction it was nearly deserted, several hundred negroes having fled from it a few days before into Fortress Monroe. On the 7th of August, a body of secessionists 7,000 strong, under Gen. Magruder, approached the village, and a little after midnight set fire to it in numerous places. The conflagration formed a magnificent spectacle. Correspondents in Fortress Monroe wrote their letters by the light of the flames.

A NEW PHASE OF THE NEGRO QUESTION.

The following important letter explains itself :—

WASHINGTON, August 10, 1861.

GENERAL—The important question of the proper disposition to be made of the fugitives from service in the States in insurrection against the Federal government, to which you have again directed my attention in your letter of July 20th, has received my most attentive consideration.

It is the desire of the President that all existing rights in all the States be fully respected and maintained. The war now prosecuted on the part of the Federal government is a war for the Union—for the preservation of all the constitutional rights of States, and the citizens of the States in the Union. Hence no question can arise as to fugitives from service within the States and Territories in which the authority of the Union is fully acknowledged. The ordinary forms of judicial proceedings must be respected by military and civil authorities alike for the enforcement of legal forms.

But in the States wholly or in part under insurrectionary control, where the laws of the United States are so far opposed and resisted that they cannot be effectually enforced, it is obvious that the rights dependent upon the execution of those laws must temporarily fail—and it is equally obvious that the rights dependent on the laws of the State within which military operations are conducted must be necessarily subordinate to the military exigencies created by the insurrection—if not wholly forfeited by the treasonable conduct of parties claiming them. To this the general rule of right to services forms an exception. The Act of Congress, approved August 6, 1861, declares that if persons held to service shall be employed in hostility to the United States, the right of their services shall be forfeited, and such persons shall be discharged therefrom. It follows, of necessity, that no claim can be recognized by the military authority of the Union to the services of such persons when fugitives.

A more difficult question is presented in respect to persons escaping from the service of loyal masters. It is quite apparent that the laws of the State under which only the service of such fugitives can be claimed must needs be wholly or almost wholly suspended. As to the remedies by the insurrection, and the military measures necessitated by it, it is equally apparent that the substitution of military for judicial measures, for the enforcement of such claims, must be attended by great inconveniences, embarrassments and injuries. Under these circumstances it seems quite clear that the substantial rights of local masters are still best protected by receiving such fugitives, as well as fugitives from disloyal masters, into the service of the United States, and employing them under such organizations and such occupations as circumstances may suggest or require. Of course a record should be kept showing a name and description of the fugitives; the name and the character, as loyal or disloyal, of the master, and such facts as may be necessary to a correct understanding of the circumstances of each case after tranquillity shall have been restored. Upon the return of peace, Congress will doubtless properly provide for all the persons thus received into the service of the Union, and for a just compensation to loyal masters. In this way only, it would seem, can the duty and safety of the government and the just rights of all be fully reconciled and harmonized.

You will therefore consider yourself instructed to govern your future action in respect to fugitives from service by the premises herein stated, and will report from time to time, and at least twice in each month, your action in the premises to this Department. You will, however, neither authorize nor permit any interference by the troops under your command with the servants of peaceful citizens in a house or field, nor will you in any way encourage such servants to leave the lawful service of their masters. Nor will you, except in cases where the public good may seem to require it, prevent the voluntary return of any fugitive to the service from which he may have escaped. I am, very respectfully, your obedient servant,

SIMON CAMERON, Secretary of War.

To Major-General Butler, commanding Department of Virginia, Fortress Monroe.

SKIRMISHING IN MISSOURI.

The Secessionists in Missouri display a most extraordinary audacity. Though they constitute, as shown by the votes, only about one-fourth part of the population, and though they have the whole power of the United States government against them, in addition to three-quarters of their fellow citizens, they keep up the war, and make a pretty good fight. Since our last we have received the particulars of two skirmishes, one near the southwest corner of the State, and the other in the extreme northeast.

THE SKIRMISH AT DUG SPRINGS.

Springfield is just about 100 miles from the southwest corner of Missouri, and has been deemed a point of some importance by both parties. On Thursday, the first of August, General Lyon, who was 12 miles west of Springfield with about 5,000 men and four batteries of artillery, received word that a body of Secessionists under Ben. McCulloch and General Rains was some 20 miles south of Springfield. He immediately started to attack them. He marched nearly all night over a very crooked road in that hilly region, stopped awhile toward morning to rest, and resumed his march the next day, which was excessively hot. At about three o'clock in the afternoon he reached a wooded valley about half a mile wide, call Dug Springs. The road led through the valley, and upon the crest of the hill opposite was seen a body of the enemy's cavalry. General Lyon sent a company of infantry forward into the woods at the right, and two companys of cavalry through the valley to the left, while the artillery advanced right down into the middle of the valley. For an hour the advance was skirmishing among the trees, slowly driving the enemy up the hill. They discovered that the force immediately in front amounted to about 1,000 infantry and 1,000 cavalry. When our cavalry got up the hill a sergeant gave the order to charge, and Lieut. Kelly, with his twenty men, saber in hand, spurred forward. Capt. Stanley countermanded the order, but it either was unheard or unheeded, for the gallant fellows were half way upon the enemy when this order war given, and seeing the uselessness of trying to stop them, the Captain ordered the balance forward, and then, with the noise of a small earthquake, the squadron drove on them. A few revolver shots, a few men sabered behind the trees, and then the whole opposition broke and fled. The advance was then recalled, and the whole force fell back a little to the northern edge of the valley and encamped. Taking this movement for a retreat, about 400 of the enemy charged down the hill, but three shots from Capt. Totten's battery, the last a shrapnell, sent them running back up the hill again.

The next day, August 3d, General Lyon continued the pursuit of the enemy, and after a march of eight miles came upon them in another bushy valley very similar to Dug Springs. Here a second skirmish occurred, almost exactly like the one of the day before, resulting in our taking 30 prisoners and driving the enemy out of the valley.

As Capt. Totten's battery was resting by the side of the road on the hill leading out of the valley to the south a body of about sixty horsemen came coolly up the road, passed along in front of the battery, the cavalry and a Missouri regiment of infantry, and went leisurely up the road. Gen. Lyon did not suspect their character when they first came in sight; but as they were passing, a suspicion arose in his mind, and he asked them to halt. They paid no attention, but kept on, when the General again asked who they were, which elicited no answer; and thereupon he ordered a charge upon them. Scarcely was the order out, before in went their spurs, and before the cavalry could mount they had gained the brow of the hill and secured their escape. They proved to be Secession Cavalry, under command of Col. Coffin.

The nex day General Lyon started on his return to Springfield.

SKIRMISH AT ATHENS.

On Monday, August 6th, a slight skirmish occurred at Athens, on the Des Moines river, which bounds the northeastern corner of Missouri. There was a considerable amount of arms and ammunition for United States troops stored at this place, under a guard of the troops composing this camp. The United States volunteers numbered about 350, under the command of Capt. Moore. The fighting lasted about an hour, when the secessionists retreated. In the meantime, Capt. Moore, having been reinforced by about 150 men from Centralia, Iowa, on the opposite side of the river, gave chase to the enemy for about a mile and a half, killing one, taking 18 prisoners, and capturing 31 horses and 2 secession flags. Several of the secessionists were also wounded in the chase. After the battle, six or eight of the enemy were found dead on the field.

A GREAT BATTLE IN MISSOURI.

We have telegraphic reports of a great battle in Missouri, the largest that has yet taken place with the exception of that at Bull Run. For a detailed description of this engagement we shall wait for fuller and more reliable accounts. According to the telegraph, General Lyon with 5,500 troops, in three columns, under himself, Gen. Siegel and Col. Sturges, of the cavalry, attacked the secessionists, 23,000 strong, nine miles south east of Springfield, at half past six in the morning of Saturday, Aug. 10th. The battle lasted all day resulting in our driving the enemy back into and through their encampment, which was occupied by our troops during the night. Our loss was eight hundred killed and wounded; including Gen. Lyon, who was shot dead from his horse while leading an attack. The command devolved upon General Siegel, who, after the victory was won, and in view of the greatly superior forces of the enemy, fell back the next day upon Springfield, and still further towards Rolla, to join his reenforcements in the rear. He destroyed the enemy's tents and baggage wagons, and took with him a considerable number of prisoners. It is reported that Ben. McCulloch, the commander of the secessionists, and General Price were both killed. Rolla is 113 miles southwest from St. Louis, with which it communicates by railroad.

THE SITUATION.

Commencing at the West, General Siegel is falling back towards Rolla, and reinforcements are being pushed forward to give him the preponderance of power.

At St. Louis, Major General Fremont, who is in command of the department of the West, is very energetically concentrating and organizing a large army, it is supposed for the descent of the Mississippi in the fall. Contracts have just been made for the construction of seven gun boats at St. Louis, one of the conditions requiring their completion within 60 days.

In western Virginia Gen. Cox was at last accounts still in pursuit of Gen. Wise, whom he was following southwardly up the valley of the Kanawha.

General Rosencranz was at Clarksburg, 160 miles north-eastwardly from General Cox's position, also operating to drive the secessionists out of Western Virginia.

Major General Banks was securely intrenched at Harper's Ferry and on the Maryland hights opposite on the north side of the Potomac.

At Washington and Baltimore Major General McClellan was concentrating a great army, it is said of 200,000 men, preparatory to a more powerful descent upon Eastern Virginia.

Major General Butler still remains at Fortress Monroe.

At the Eastern shipyards, the greatest activity prevails in altering commercial steamers and building steam gun-boats to complete the blockade and sweep the enemy's privateers from the ocean.

In the great commercial cities the bankers and

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monied men are pledging their means to carry on the war.

The three months' militia have returned to their homes and their places have been supplied by volunteers enlisted for three years. The armies have all been placed under the commands of able and educated officers in the vigor of middle life, and all the movements show that in the coming autumn—now near at hand—the whole power of the nation is to be put forth in a combined and gigantic effort to overwhelm and crush the rebellion at a blow.

Generals McClellan and Fremont.

The untiring energy of McClellan astonishes those who do not know his habits. He is up early and attends to his office business till two o'clock. He then mounts his horse and is in his saddle till eight or nine o'clock in the evening. He wears a simple blue flannel blouse, and usually wears no insignia of his office or position. He is plain and simple as a farmer, and is without a spark of pretension of any sort. He has an eye to everything himself, and therefore fully understands his position.

The energy and skill displayed by Gen. Fremont, says the Missouri *Republican*, since his arrival at his headquarters in this city, are wonderful, and afford a fresh and striking illustration of those remarkable traits of character and mind which have already made him a prominent personage in the eyes of the civilized world.

He reached there on the morning of the 25th of July, at about 9 o'clock. At noon of the same day he called a meeting of his staff, and though recommended to take a little rest after his continuous day and night travel from the East, remarked that his business was important, and he *must go to work*. Since that date he has labored unremittingly in the organization of his department, and in laying the foundation of those important plans which have been confided to him by the government for the movement of a grand army down the Mississippi River during the coming fall.

He rises in the morning at 5 o'clock, and rarely quits his labor before twelve o'clock at night, in this respect resembling the habits of Alexander von Humboldt, the Duke of Wellington, and other historical characters to whom sleep seems to have been one of the least important requirements of their natures. In all his orders he is explicit and comprehensive, and in his appointments punctual to the minute.

Heavy Ordnance for Missouri.

An unusually heavy shipment of ordnance and ordnance stores has recently been made from the United States Arsenal at Pittsburgh. It was consigned to Major General Fremont, commanding the Department of the West at St. Louis, and consisted of the following pieces of heavy artilery, the whole weighing 501,967 lbs. :—18 32-pounder iron guns, 18 24-pounder iron guns, 18 32-pounder barbette guns, carriages and caissons, 18 24-pounder do., implements and equipments complete, 1,000 32-pounder shot, 1,000 24-pounder shot, 90 32-pounder canister, 90 24-pounder canister, 90 32-pounder grape stands, 90 24-pounder grape stands, 1,000 32-pounder gun cartridges (for shot), 1,000 24-pounder gun cartridges (for shot), 180 24-pounder gun cartridges (for grape and canister), 180 32-pounder do. do.

Another order for ten thousand sets of infantry accoutrements has also been received from the General, and the hands of the arsenal are filling it now with all the rapidity in their power. Besides the above, the arsenal authorities have received a requisition for a large number of howitzers and siege carriages, with implements and equipments, columbiad platforms, pintel crosses, traverse circles, &c., to be forwarded to New York with the least possible delay. The amount of war material drawn from the arsenal thus far has been enormous, but the stores still on hand are very large, and will doubtless be found equal to any demands that may be made upon them for months to come.—*Pittsburgh Chronicle.*

MADISON'S ADVICE.—"The advice nearest to my heart," says Madison, "and deepest in my convictions is *that the Union of the States be cherished and perpetuated.* Let the open enemy to it be regarded as a Pandora with her box opened, and the disguised one as the serpent creeping with his deadly wiles into Paradise."

Duty of the American Army.

On the 21st ult. Hon Joseph Holt visited the Kentucky soldiers at "Camp Joe Holt." His address on that occasion is one of the most beautiful and appropriate we ever read. The following extract upon the duty of the Federal army as it makes its way southward, we heartily commend :—

Should you occupy the South, you will do so as friends and protectors, and your aim will be, not to subjugate that betrayed and distracted country, but to deliver it from the remorseless military despotism by which it is trodden down. Union men, who are your brethren, throng in those States, and will listen for the coming footsteps of your army as the Scottish maiden of Lucknow listened for the airs of her native land. It is true that, amid the terrors and darkness which prevail there, they are silenced and are now unseen, but be assured that by the light of the stars you carry upon your banner you will find them all. * * * * It will be the first and the highest duty of the American army, as it advances South, by its moderation and humanity, by its exemption from every excess and irregularity, and by its scrupulous observance of the rights of all, to show how foully both it and the government it represents have been traduced. When, therefore, you enter the South, press lightly upon her gardens and fields ; guard sacredly her homes; protect, if need be, at the point of your bayonets, her institutions and her constitutional rights, for you will thereby not only respond fully to the spirit and objects oft his war, but will exert over alike the oppressed and the infatuated portion of her people a power to which the most brilliant of your military successes might not attain.

THE SPOILS OF VICTORY.—A correspondent of the Cincinnati *Times*, writing from Western Virginia, gives an official report of the arms, ammunition, camp equipage, &c., captured by the Union forces at the battle of Rich Mountain. They consist of 1,004 muskets, 18,000 rounds of powder, 7,000 rounds of canister, 4,000 rounds of shot, 4 brass six-pounders, 4 caissons, 84 horses, 64 harness, 40 wagons, 20 saddles, 193 tents, 12 stands of colors, 400 pairs of pants, 1 blacksmith's forge, 1 buggy and harness, clothing, trunks, and camp equipage of various kinds, a large lot of hospital stores, drugs, medicines, surgical instruments. All these munitions have been turned over to the Quartermaster. Three hundred prisoners were taken, besides the seven hundred surrendered by Colonel Pegram. All the prisoners, except Colonel Pegram, having given their parole not to bear arms against the United States government, nor to give aid or information to the disunionists during the war, were subsequently escorted beyond our lines and released.

DAVIS ON INSURRECTION.—Jeff. Davis when Secretary of War had no mercy for insurrection. When the Topeka Convention assumed authority over the Territory of Kansas, Mr. Davis called for two regiments from Kentucky to be ready at the call of Gen. Persifer Smith, and wrote to that officer as follows :

The position of the insurgents is that of open rebellion against the laws and constitutional authorities, with such manifestations of a purpose to spread devastation over the land as no longer justifies further hesitation or indulgence. Patriotism and humanity alike require *that rebellion should be crushed.*

Davis is now precisely in the same position, and yet he asks to be "let alone," that he may innocently indulge his inclination for breaking up the government, without incurring the penalties for such causeless mischief and wickedness.—*Philadelphia Ledger.*

DEFECTIVE PERCUSSION SHELLS.—A member of the Palmetto Regiment who was at the battle of Bull Run gives the following account in the Charleston (S. C.) *Mercury*, of our percussion shells. He says :—"The percussion shells with which the enemy so liberally bespattered the country have left their sting behind them. Of twenty fired into the hill on which we first stood, not one exploded ; but they do explode easily when struck upon the right point ; and those handled by the soldiers, and dropped carelessly, are liable to do great injury. Two in this way have been exploded, and one killed a man in Col. Preston's regiment and badly wounded two others."

IMMENSE MILITARY CAMPS.—The Baltimore *Clipper* is informed, upon the best military authority, that in less than five weeks there will be encamped about that city nearly two hundred thousand soldiers. Baltimore is contiguous to three important points, viz., Harper's Ferry, Washington and Fortress Monroe, and presents better accommodations, in many respects, than can be found elsewhere. Troops are now rapidly moving Southward. In addition to the Baltimore encampment, another extensive one is about to be established at Jefferson City or St. Louis, Mo., under Major-General Fremont.

Rocket Batteries.

Rocket batteries are suggested as means to drive the rebels out of their masked retreats. Those used in the British service are propelled through a thick iron tube, the fuse being cut to burn a given distance, as in the case of a shell ; to the rocket is attached a pole from eight to ten feet long, which, coming in collision with any object, has the effect of starting the rocket in the opposite way ; in the meantime the projectile is vomiting a perfect sheet of liquid flame, lighting up everything for a mile around, and igniting everything of an inflammable nature, while the dense smoke arising therefrom will cause the best disciplined soldiers to leave their guns and flee in search of a purer atmosphere. It finally terminates in a shell of the most destructive kind.

The above has appeared in several of our exchanges. The rockets referred to are a species of fire-work invented by Sir W. Congreve, and first used by the British army in Portugal, where they were the cause, upon one occasion, of throwing the French ranks into some disorder, but they are not held to be very dangerous. They are now used in all armies when required, and are very useful for revealing the presence of an enemy at night. A rocket consists of a cylindrical case of pasteboard, and sometimes of iron attached to the end of a rod. They usually weigh from half a pound to two pounds. The cylinder is filled with a composition of sulphur, charcoal and gunpowder, in meal. This composition produces slow combustion and propels the rockets by a succession of impulses. Rockets of from one to two inches in diameter have been known to ascend to a vertical hight of 500 yards ; those of from two to three inches diameter, 1,200 yards. For signaling at night rockets are indispensable. They have been seen at distances varying from 35 to 40 miles.

Manufacture of Rifled Cannon at Pittsburgh.

The foundries at Pittsburgh are turning out rifled cannon with great rapidity. A correspondent of the Cincinnati *Union* gives an interesting account of the progress of the work, from which we copy the following:—

Piles of shell and round shot, from the huge 15-inch to the tiny grape and canister, lay around the room in one of these factories, being packed ready for shipment almost before they are cool. In the machine shop adjoining, a huge 18-inch Columbiad is revolving on a lathe, while some twenty siege howitzers and the short, kettle-shaped mortars are being bored and turned. Here the great Rodman gun was cast, and another 18-inch monster is soon to be constructed. Com. Dahlgren has sent on an order for a large number of his heavy 9 and 11-inch ship's guns, and, within the past two weeks, they are beginning to rifle the Columbiads on hand. During the present week, over twenty heavy guns have been sent to St. Louis, beside large quantities of shot and shell ; and this morning, as I am writing, the United States ordnance officers have gone out to the proving grounds with ten large 8-inch howitzers that are to be sent immediately to Gen. Fremont, at St. Louis.

Messrs. Knap, Rudd & Co. employ a large number of hands night and day, in order to complete the government contracts. They are now turning out at the rate of nine rifled cannon per diem. They manufacture, beside the 9 and 11-inch Dahlgren, 8 and 10-inch howitzers, 8 and 10-inch Columbiads and mortars, a very nice battery of iron 6 and 12-pounder guns, first tried for experiment, but which have become practicable.

New Mode of Taking a Fort.

The scheme, suggested by a Mobile paper, of taking Fort Pickens, by throwing bomb shells of pepper into it, seems to have been abandoned, and a new scheme is started of the following terrible character. The Mobile *News* says:—"Let General Bragg detail a few thousand of his ten thousand to the work of catching snakes ; and as soon as they have collected several cart loads of these interesting reptiles, let tin or sheet-iron shell, or canisters, be charge with them—the enclosure being cylindrical and of size to fit the largest mortar, and so made that it will break to pieces and liberate its contents upon falling within the fort. We would warn those who charge the shells to put only the same species into each, as, if the different snakes were mixed they would sting each other to death before having a chance to operate on Billy Wilson's Zouaves. The corners and interstices in each shell might be filled up with a few quarts of tarantulas, scorpions, centipedes and lizards, however, to make close work, as the snakes would pack loosely."

Our Southern cotemporary would find the occupation of catching venomous reptiles most excellent sport, and cart loads of them could be handled by the secessionists with perfect impunity, but they would certainly bite a Yankee. Very good scheme. Let it be carried out.

The Louisville *Journal* says that the game of secession is played out in its State ; there is not a trump in the miserable hand.

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MANUFACTURE OF TIN-PLATE.

The following condensed description of the manufacture of tin plate is obtained from our English cotemporary *The Ironmonger*. The description will be interesting to a great number of our readers because tin-plate is so extensively used in America, and all our supply is furnished by England. We are the best customers of tin ware which Uncle John has, not excepting his own precious self.

Tin-plate consists of sheet iron rolled out to various degrees of thinness, and coated on both sides with a layer of tin, which forms with the iron an alloy uniting the useful qualities of both metals. The process of tinning iron is not the same in all establishments; some manufacturers affect a good deal of mystery upon the subject; still it may safely be averred that the different methods pursued agree pretty nearly in all essential points, and the following may be taken as a tolerably accurate description of the process most generally adopted :—

The best *charcoal iron* is used for tin-plates. The sheet iron coming from the plate mill is cut with shears into rectangular plates of different sizes, which are piled, with a little sawdust sprinkled between each plate, to keep them separate; the pile is immersed in dilute sulphuric acid, an operation which is technically termed "pickling." In four or five minutes the plates are taken out of the pickle, piled on a stand, covered with a cast iron box, termed an *annealing-pot*, and exposed in this to a dull red heat in a reverberatory furnace for twenty-four hours. The annealed plates, when cold, are passed between hard polished rollers; this process of cold-rolling tends to "harden" the metal a little too much, and to impair in some slight degree its ductility; to remedy this defect, therefore, the plates are annealed again at a low heat; after which they are washed in dilute sulphuric acid to clean away the scales of oxyd of iron that may have formed on the surface; this latter operation is assisted by a gentle heat of 90 or 100° Fah., for which purpose the leaden cistern containing the pickle is generally placed over a heated flue. Care must be taken not to leave the plates too long in the pickle, lest they should become stained. From the pickle the plates are transferred to a cistern filled with clean water, and scoured with sand and hemp until they are perfectly bright and chemically clean on the surface, which is an indispensable condition for the adhesion of the tin. In this state they may be kept for months immersed in pure water without rusting; but a few minutes' exposure to the air rusts them. The process of tinning is conducted in a building specially fitted for the purpose called the *stow*. It contains six cast iron vessels of various sizes, with proper fire places beneath each of them. These vessels, technically termed "pots," are arranged in a row from right to left. The extreme right is occupied by the first pot, called the *Tinman's-pan*, which is full of melted grease; the plates having been taken to the stow, with all proper care to keep the surface perfectly bright and clean, are immersed in this grease pot (No. 1), and left there until all aqueous moisture is evaporated upon them, and they are completely covered with the grease. After this they are taken to the second pot, called the *Tin-pot*, containing a melted mass of about ten cwt. of block and grain-tin, in nearly equal proportions, covered with a layer of melted tallow, about four inches deep, to protect the molten metal from contact with the air; into this bath the greased plates are plunged in a vertical position to the number of several hundreds, and kept there for a space of time varying from one to two hours, the bath being kept at as high temperature as it will bear without firing the grease. As the surface is not uniformly covered in this first dipping, the plates are transferred from the tin-pot to another vessel, called the *washing* or *dipping-pot;* this is divided into two compartments, a larger and a smaller, each of them containing a bath of molten best grain-tin covered with grease. The plates are plunged first into the bath in the larger compartment, and left there a sufficient time to get the surfaces uniformly coated with tin. A long table stands between the *tin-pot* and the *dipping-pot*; to this the plates are now removed for the purpose of being wiped on both sides with a hempen brush, after which they are dipped in the second compartment of the wash-pot, which contains only the purest tin. After the washing of a certain number of plates, say 15,000, the contents of the second compartment, having suffered some deterioration from becoming mixed with a slight proportion of the iron and tin alloy formed, are removed to the first compartment, and thence again to the tin-pot, the wash-pot being replenished with a fresh quantity of grain-tin. The tinning is now complete, but the plates still require a species of annealing, to prevent the alloy on the surface of the plate cooling quicker than the iron, or otherwise the face of the plate would be sure to be cracked; besides, the superfluous tin must also be allowed to run off. For this purpose the plates are removed to a large cast iron vessel, called the *Grease-pot* (No. 2), which contains clean melted tallow, or unsalted lard; this part of the operation requires the neatest management as to the temperature of the grease, which must neither be too high nor too low for the intended purpose. The pot has pins fixed within it to keep the plates asunder; as soon as five plates have been transferred to it, the boy who assists the workman lifts the first plate out and transfers it to a fifth pot, called the *Cold-pot*, filled with tallow, heated to a comparatively low temperature; as soon as the workman puts a sixth plate into No. 4, the boy removes the second to No. 5, and so on. The plates are left in No. 5 until they are cold enough to be handled. As they were placed vertically in the several baths, a *list* or *selvedge* of tin adheres to the lower edges. To remove this the plates are now, lastly, dipped in the so-called *List-pot*, a cast iron vessel, which contains only a small quantity of melted tin, sufficient to cover the bottom to the depth of a quarter of an inch; in this bath, which is kept at a rather high temperature, the plates are left until the list or selvedge of tin is melted, when the plate is taken out by the boy, and the list detached by a smart blow with a stick. The plates are now finally cleansed from grease by rubbing with dry bran, and then sorted according to quality and size, and packed up in boxes. There are now some twenty different qualities in common use, distinguished by certain marks attached to the boxes; the standard for quotation being what is technically called "Common, No. 1," viz., 225 plates 13¾ by 10 inches, weighing exactly one cwt. in a box.

The plates so prepared are worked up by the tinman, or tin-plate worker, into a great variety of articles of culinary or domestic use, about which we will now proceed to say a few words.

An infinite variety of articles of domestic and culinary use are made of tin-plate. The tin-plate is cut into the required disks, strips, &c., by means of shears, susceptible of being set to any gage required. A great deal of the work is done by stamping. Among the articles raised by stamping may be mentioned dish covers, which require several repetitions of the process; they must be annealed each time, otherwise the next blow of the stamp might break the plate. When they come from the stamp they are puckered and full of wrinkles, which are *wheeled* out of them between rollers, moving in opposite directions, six covers being placed under the rollers at a time. The metal spouts for coffee and tea-pots are stamped in two parts, which are afterwards soldered together. Lids and covers for kettles, &c., are also executed by the stamp. Lamp-bowls, stewpans, saucepan lids, are first raised by the stamp, then burnished to form in the lathe.

Cylindrical and conical vessels are mostly formed by stamping. The process of hollowing mouldings was formerly performed on blocks of wood, with wooden mallets, but a very simple and ingenious machine is now generally employed for this purpose. This machine consists of three cylindrical iron rollers, fixed in an iron frame; two of these rollers are connected by toothed wheels, so as to travel in opposite directions, exactly the same as a pair of laminating rollers for sheet metals; the third or upper roller is placed above and just opposite the other two, but is not connected with them, and is accordingly free to move on its pivots. This upper roller can be raised or lowered at pleasure, to modify the diameter of the cylindrical vessel; by placing it out of level, *i.e.*, with one end higher than the other, the conical curvature is given to the strip of metal subjected to the action of the machine. The top-edges of culinary and other vessels are generally turned down and folded over wire to stiffen and strengthen them; the upper roller of the bending or forming machine and one of the lower ones are therefore turned into semi-circular grooves, to receive the thickened edge which contains the wire; rollers are employed also for preparing the seam or fold to contain the wire. The beadings, which are occasionally placed upon the edges of vessels, are made in a species of draw-bench, much in the same way as tubes, and are then slit open in the seam to the width required, according to the thickness of the edge. These beadings are now made of Britannia metal, the application of which is of comparatively recent date, and considered a great improvement.

The process of seaming, soldering and riveting the several parts of the tin-plate vessels are too well known to require comment.

Japanning is a method of varnishing or lackering articles in metal, wood and other materials, with a peculiar lacker, the juice of a tree which grows in the Japanese islands. This juice is obtained by making incisions in the lower part of the trunk; it looks like cream when first oozing out, but turns speedily black in the air. After the application of every coat of color or varnish, the object so colored or varnished is dried in an oven or chamber, called a stove, and heated by flues to as high a temperature as can safely be employed without injuring the articles or causing the varnish to blister. All articles so japanned, or, to use the technical term, "stoved," are more durable than they would be if simply left to dry in the air.

For black grounds, drop ivory-black mixed with dark colored animé varnish is used; for colored grounds, the ordinary painter's colors, ground with linseed oil or turpentine, and mixed with animé varnish. The colors most in use are white lead, cobalt-blue, yellow, vermilion (used more particularly to imitate tortoise-shell), Indian red, verdigris, umber and the intermediate tints produced by mixing two or several of them together. The varnishes most used are animé and copal. The grounds and varnishes are generally laid on with painting brushes, or flat brushes made of fine soft bristles. Tin-plate articles intended for japanning are first thoroughly cleansed from every trace of grease that may adhere to them, with turpentine or spirits of tar, then rubbed with sandpaper. They are then ready to receive the first coat, after which they are thoroughly dried in the stove.

For black japanned works, the ground is prepared with a coating of black made as just now stated, by mixing drop ivory-black with dark-colored animé varnish, which gives a blacker surface than would be produced by the japan alone; and the object is then dried in the stove. From three to six coats of japan are afterward successively applied, the work being always thoroughly dried again in the stove or oven between the laying on of every fresh coat.

For brown japanned works, umber is mixed with the japan to give the required tint, the process in all other respects being the same as for black japanned works,

The colors are protected against atmospheric influences, and made to shine with greater brilliancy, by two or three coats of copal or animé varnish. Superior articles receive as many as five or six coats of varnish, and are finally polished.

The ornamentation of all such articles as come under the head of toilet wares, is effected by the ordinary mode of painting with the camel's hair pencil or some fitting substitute; where imitations of woods or marble are intended, the ordinary grainer's tools are used. Many patterns are produced upon the various articles by "transfer printing." The designs are etched on copper plates, and printed on a species of tissue paper in the required colour, the paper is then placed with the printed side upon the part of the object which it is intended to ornament, and rubbed down upon it with a flannel rubber; the paper is then washed away with water, which leaves the design intact. The composition of the ink or color used for transfer printing is a subject on which it would appear some mystery is affected by the printers; there can be no doubt, however, that boiled linseed oil forms one of the chief ingredients.

Gilding is executed by penciling the design on the object with japanner's gold size, and when this is nearly dry, but still clammy, covering it with gold-leaf, burnishing with agate or bloodstone, and highly varnishing with copal varnish. The parts which are to be in dead gold (called *matt*), are left unburnished, and a thin coat of size or glue, slightly warmed, is passed over them.

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Tunneling.

Abstract of a paper on the details of tunneling, read before the Civil and Mechanical Engineers' Society of Great Britain by J. S. Allen :—

He said the first step necessary was to obtain very accurate surveys, levels, and borings in the neighborhood of the proposed works ; these (together with the trial shafts which are usually sunk at the company's expense previously to letting the contract) will give data on which to frame a detailed estimate. When these preliminaries are finished, the engineer must carefully set out the center line on the ground. Where a tunnel is straight it is usual to erect an observatory, and fix therein a transit instrument. On a curved tunnel such an observatory is almost useless. The author described and recommended Mr. Rankine's method of laying out a curve on the ground, and then proceeded to show the process of transferring the line from the surface to the works below ; this was done by means of two plumbobs let down the shaft in cups of water or mercury : these plummets are carefully ranged in the line, and an assistant below can, with another theodolite or transit, mark two points on the shaft timbering. From these two the future works are set out. If a heading is driven through the tunnel, caudles and trails may be ranged in line from shaft to shaft. The setting out of a curve in a tunnel was then described, as also the transferring of the levels by means of 10 ft. rods down the shafts, from a bench mark on the ground to one below. Shafts are usually constructed by excavating a certain depth, say 6 ft., and the building up the brickwork which rests on a wooden curb at the bottom of the excavation. Digging is then resumed within the brickwork, as far as is consistent with safety, leaving a narrow ledge all round on which it rests. This ledge is then dug away in four places to admit of props being inserted ; the rest can now be removed and more brickwork carried up to meet that previously executed. This process is repeated to the bottom of the shaft, where a large hole or sump should be made to collect the water to be pumped up. Shafts are sometimes built upon the surface, and then (the earth being removed from below) allowed to sink by their own weight. The Thames tunnel 40 ft. shafts were so executed. Instead of timbering the lower portion of the shafts, hanging curbs are sometimes employed. These consist of a curb at the bottom, suspended by means of stout cross balks of timber and wrought-iron rods from similar timbers at the top of the shaft. To hoist materials from the tunnel either horse-gins or portable steam engins are used. It is usual to drive a heading or rectangular passage, about 5 ft. high by 4 ft. wide, right through the whole length of the tunnel, if practicable. The excavation is commenced above this heading, the level of the bottom of which should be about that of the intended insert, if there is to be one.

When the excavation is completed and timbered to the full size of the section the work is ready for the bricklayers. They are guided by what is termed a leading frame. This is a model in wood of the interior face of the brickwork.

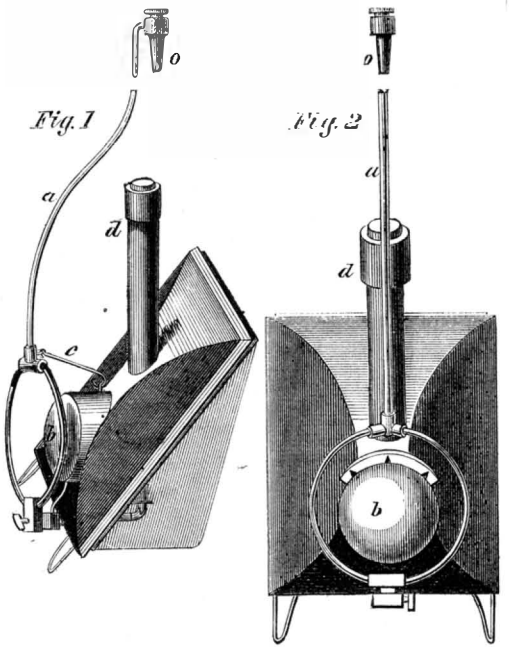
The setting of the centers, as well as the frames just referred to, is a work requiring great nicety and care. Fraser's patent centers in three ribs, and requiring no internal bracing, have been successfully employed on some works.

OUTSIDE REFLECTORS FOR STORE WINDOWS.

The accompanying engravings illustrate an improvement in reflecting lights for windows lately patented in England by by J. Clark, London,

The nature of this invention consists in arranging lanterns in such a manner that a strong light shall be thrown upon the pavement in front of store windows, and also into the store. But when it is not desirable to throw the light upon the pavement, the lantern may be employed for striking advertising purposes by inserting a frosted sheet of glass with the advertisement painted or printed upon it.

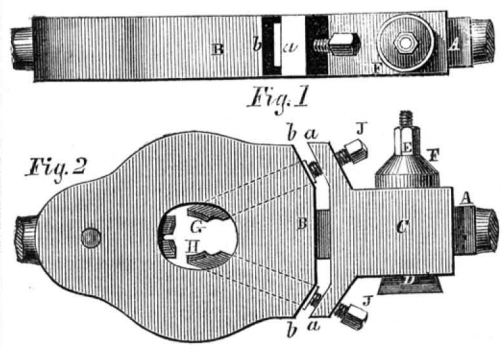
Fig. 1 is a side view of the pendant or gas pipe with the lamp attached ; Fig. 2 being a back view of the same. The gas pendant, *a a*, is formed somewhat similar to those at present in use, but having the lower part formed of two semicircles attached to an inverted T-piece at top and bottom, thus forming a ring through which the light from the lamp is reflected by the lens, *b*, down upon the pavement or road, but when not so required a glass with any desired announcement thereon may be placed within the ring for the purpose of advertising ; the light from the burner reaches to or about the center of the lens or bull's eye which is to be placed at the back or sides of the lantern as shown, and may be so arranged as to adjust it to the required angle. The lantern is supported on the gas arm or elbow by pins or legs dropping into holes in a boss formed on the elbow, and is



kept steady in windy weather by a brace, *c*, hooked to the lamp case and pendant. The chimney, *d*, is to be provided with a fluted cap of an inverted cone shape having apertures beneath, or other means may be adopted for the purpose of supplying the interior of the lamp with the necessary quantity of atmospheric air, at the same time preventing the wind and rain entering within the case.

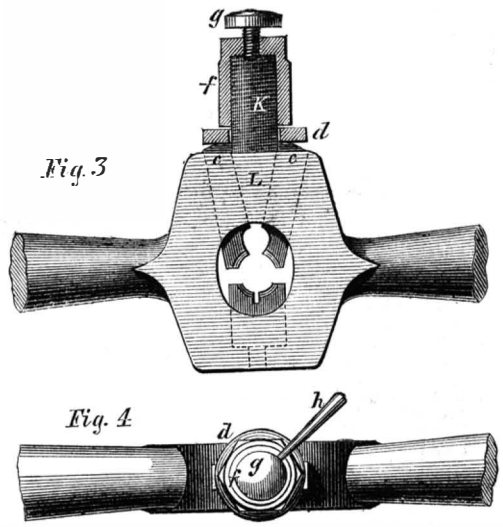
IMPROVED SCREW STOCKS AND DIES.

The accompanying engravings, lately illustrated and described in the London *Engineer*, represent improvements in those useful tools—screw stocks and dies—for which a patent has been taken out by W. Eades and G. Worstenholm, of Birmingham. The invention consists in placing the adjustable dies into the stock in a radial direction, and fitting on the shoulder of the handle next to the movable dies a sliding collar flanged at the outer ends for receiving set screws, which screws abut against the outer end of the movable dies, and through this slide and shoulder of the stock a wedge is fitted with an adjusting screw, by the turning of which, in the direction required, the collar will be advanced or freed, so as to press in or free the dies. The effect of this arrangement is of importance, as the set screws first referred



to define the depth of the thread and size of screw intended to be cut, and in no instance can this be varied, unless by altering the position of the set screws, so that great accuracy is insured, which is highly essential when a number of bolts or such like articles require to be screwed of the same size, as the last will be found to be of the exact size and depth of thread as the first, both fitting the same nut when in use. When the dies require shifting for cutting larger or smaller screws, the readjustment is first effected by the side screws applied to the flanges of the collar before referred to. The distance between the flanges and the shoulders of the stock at all times define the range of the collar and the depth of the thread, the collar being gradually advanced towards the dies by the screw wedge. And this same result may also be obtained by screwing the handle at that part in contact with the stock nearest the movable dies, and pressing forward the sliding collar by means of a suitable nut.

Figs. 1 and 2 represent an edge and flat view of a stock and dies adjusted and constructed with the improvements. The part, A, is cast or otherwise formed with the part, B, which is solid, that is to say, recesses formed for the dies in the solid metal without being held in by an additional plate with screws, as now commonly done ; and over the part, A, the collar, C, is passed, and is advanced towards the center of the stock by the wedge, D, partly shown in dotted lines, being pulled through or freed back by the nut, E, the part, F, being simply a loose collar, so that the wedge not only passes through the collar, C, but also in the same direction through the part, A. The movable dies, G and H, partly seen in dotted lines, are adjusted to their work by the set screws, J and J, tapped through the flanges of the collar, C, as here shown. And let it be supposed that the stock is placed in position for screwing a pin ; as the work proceeds the nut, E, is turned round, pulling the wedge through from its broadest end, which will have the effect of advancing the collar, and by the ends of the pins, J and J, being in contact with the outer ends of the movable dies, the dies will also be advanced, and this may be continued by turning the screw, E, until the part of the flanges, marked *a a*, are in contact with *b b*, and the distance between the part, *a*, of the flange and the shoulder, *b*, of the stock will always define the depth of the thread, so that when it may be desirable to screw a number of bolts of the same size, great accuracy will be thus in-



sured without extra skill or attention from the operator, as the mere reversing the nut, E, to admit of the retiring of the wedge the collar will be drawn back, allowing the movable cutters to expand to the full circumference of the pin desired to be screwed.

And this same result is obtained in an efficient and economic manner by forming the stock as exhibited in a flat and edge view at Figs. 3 and 4. K is a strong hardened or tempered screwed pin formed with the part of the stock marked, L, the outer end of the movable dies marked, *c c*, project through the mortices in which they are placed, and against them a loose collar or washer, as here shown in section, *d*, and next the nut, *f f*, also shown in section, the end of which is closed and fitted with a finely wormed set screw, marked *g g*. For illustration it may be observed that in cutting a thread with this stock the nut, *f*, has to be gradually turned around, and this may be progressively continued, thereby advancing the movable dies to their work, as indicated in dotted lines, until the inner end of the set screw, *g*, comes in contact with the end of the pin, K, which will stop the further action in that direction of the collar or nut, *f*, and thereby define the depth of the thread desired to be cut. By reversing the action of the nut, *f*, the cutters may be again expanded to cut in like manner a screw of the same size and depth of thread as the former, the head of the set screw, *g*, may be divided on its periphery, so that it may be shifted and reset in the same position as required, and provided with holes for the insertion of a lever as at *h*, Fig. 4, for turning it around or otherwise, as preferred.

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THE WILD MAN OF THE WOODS.

The continent of Africa where the equator crosses it is about 2,200 miles in breadth, a vast unknown tropical region, which has been explored for only a few hundred miles in its eastern and western portions. So far as examined it is a mass of hills and mountains, covered with the dense forests of the tropics, inhabited by strange tribes of cannibal negroes, and still stranger tribes of gigantic monkies which are almost human in their aspect and organization. The country is traversed by rivers, and embraces great sea-like lakes, in which hippopotami wallow and fight, and alligators in countless numbers bask in the vertical rays of the sun.

The western portion of this region to a distance of 330 miles from the coast has been explored by Paul B. Du Chaillu, an American of French parentage. He was associated with his father in trade on the African coast for four years, and, being a student of natural history, was desirous of procuring specimens of the peculiar animals of Central Africa, which were unknown to the world of science. He was particularly anxious to obtain specimens of the gorilla, the great tailless ape, which approaches nearer to man, in its structure, than any other of the lower animals. This anxiety was not a little hightened by the stories which the natives told of the gigantic strength and ferocity of the gorilla, and of its half human affections, manners and customs. Mr. Du Chaillu started on his exploration in 1856 and spent four years in the forests unaccompanied by any white person, traveling on foot more than 8,000 miles. During this time he killed and stuffed more than 2,000 birds and 1,000 quadrupeds, 80 being new species. He brought his collection to this country, where it was exhibited for a while to the public. The exhibition was noticed at the time in the SCIENTIFIC AMERICAN. He afterwards took it to England, where it has excited the greatest interest among naturalists, reviving the discussion of the development theory of creation, which embraces the question of the human race being descended from monkies.

Mr. Du Chaillu has published an account of his explorations, from which we take the following extracts :—

KILLING HIS FIRST GORILLA.

We started early, and pushed for the most dense and impenetrable part of the forest, in hopes to find the very home of the beast I so much wished to shoot. Hour after hour we traveled, and yet no signs of gorilla. Only the everlasting little chattering monkeys—and not many of these—and occasionally birds. In fact, the forests of this part of Africa—as the reader has seen by this time—are not so full of life as in some other parts to the south.

Suddenly Miengai uttered a little *cluck* with his tongue, which is the native's way of showing that something is stirring, and that a sharp look-out is necessary. And presently I noticed, ahead of us seemingly, a noise as of some one breaking down branches or twigs of trees.

This was the gorilla, I knew at once, by the eager and satisfied looks of the men. They looked once more carefully at their guns, to see if by any chance the powder had fallen out of the pans; I also examined mine, to make sure that all was right; and then we marched on cautiously.

The singular noise of the breaking of tree branches continued. We walked with the greatest care, making no noise at all. The countenances of the men showed that they thought themselves engaged in a very serious undertaking; but we pushed on, until finally we thought we saw through the thick woods the moving of the branches and small trees which the great beast was tearing down, probably to get from them the berries and fruits he lives on.

Suddenly, as we were yet creeping along, in a silence which made a heavy breath seem loud and distinct, the woods were at once filled with the tremendous barking roar of the gorilla.

Then the underbrush swayed rapidly just ahead, and presently before us stood an immense male gorilla. He had gone through the jungle on all-fours; but when he saw our party he erected himself and looked us boldly in the face. He stood about a dozen yards from us, and was a sight I think I never shall forget. Nearly six feet high, (he proved four inches shorter,) with immense body, huge chest, and great muscular arms, with fiercely-glaring large deep gray eyes, and a hellish expression of face, which seemed to me like some nightmare vision; thus stood before us this king of the African forest.

He was not afraid of us. He stood there, and beat his breast with his huge fists till it resounded like an immense base-drum, which is their mode of offering defiance; meantime giving vent to roar after roar.

The roar of the gorilla is the most singular and awful noise heard in these African woods. It begins with a sharp bark, like an angry dog, then glides into a deep base roll, which literally and closely resembles the roll of distant thunder along the sky, for which I have sometimes been tempted to take it where I did not see the animal. So deep is it that it seems to proceed less from the mouth and throat than from the deep chest and vast paunch.

His eyes began to flash fiercer fire as we stood motionless on the defensive, and the crest of short hair which stands on his forehead began to twitch rapidly up and down, while his powerful fangs were shown as he again sent forth a thunderous roar. And now truly he reminded me of nothing but some hellish dream creature—a being of that hideous order, half man, half beast, which we find pictured by old artists in some representations of the infernal regions. He advanced a few steps—then stopped to utter that hideous roar again—advanced again, and finally stopped when at a distance of about six yards from us. And here, just as he began another of his roars, beating his breast in rage, we fired, and killed him.

With a groan which had something terribly human in it, and yet was full of brutishness, he fell forward on his face. The body shook convulsively for a few minutes, the limbs moved about in a straggling way, then all was quiet—death had done its work, and I had leisure to examine the huge body. It proved to be five feet eight inches high, and the muscular development of the arms and breast showed what immense strength it had possessed.

My men, though rejoicing at our luck, immediately began to quarrel about the apportionment of the meat—for they really eat this creature. I saw that they would come to blows presently if I did not interfere, and therefore said I would myself give each man his share, which satisfied all. As we were too tired to return to our camp of last night, we determined to camp here on the spot, and accordingly soon had some shelters erected and dinner going on. Luckily, one of the fellows shot a deer just as we began to camp, and on its meat I feasted, while my men ate gorilla.

A YOUNG GORILLA.

This time I was accessory to its capture. We were walking along in silence, when I heard a cry, and presently saw before me a female gorilla, with a tiny baby-gorilla hanging to her breast and sucking. The mother was stroking the little one, and looking fondly down at it; and the scene was so pretty and touching that I held my fire, and considered—like a soft-hearted fellow—whether I had not better leave them in peace. Before I could make up my mind, however, my hunter fired and killed the mother, who fell without a struggle.

The mother fell, but the baby clung to her, and, with pitiful cries, endeavored to attract her attention. I came up, and when it saw me it hid its poor little head in its mother's breast. It could neither walk nor bite, so we could easily manage it; and I carried it, while the men bore the mother on a pole. When we got to the village another scene ensued. The men put the body down, and I set the little fellow near. As soon as he saw his mother, he crawled to her and threw himself on her breast. He did not find his accustomed nourishment, and I saw that he perceived something was the matter with the old one. He crawled over her body, smelt at it, and gave utterance, from time to time, to a plaintive cry, "Hoo, hoo, hoo," which touched my heart.

I could get no milk for this poor little fellow, who could not eat, and consequently died on the third day after he was caught. He seemed more docile than the other I had, for he already recognized my voice, and would try to hurry toward me when he saw me. I put the little body in alcohol, and sent it to Dr. Wyman, of Boston, for dissection.

The mother was skinned: and when I came to examine her, I found her a very singular specimen. Her head was smaller than that of any other gorilla I ever saw, and the rump was of a reddish-brown color. These are peculiarities which made this specimen different from all others I have seen. I call her, therefore, the gorilla with the red rump.

A YOUNG APE OF ANOTHER SPECIES.

For some hours after we started we saw nothing but old tracks of different wild beasts, and I began to think that Anguilai's *ogana* had been too sanguine. Finally, toward twelve o'clock, when we were crossing a kind of high table-land, we heard the cry of a young animal, which we all recognized to be a nshiego mbouvé. Then all my troubles at once went away out of mind, and I no longer felt either sick or hungry.

We crawled through the bush as silently as possible, still hearing the baby-like cry. At last, coming out into a little cleared space, we saw something running along the ground toward the spot where we stood concealed. When it came nearer we saw it was a female nshiego mbouvé, running on all fours, with a young one clinging to her breasts. She was eagerly eating some berries, and with one arm supported her little one.

Querlaouen, who had the fairest chance fired, and brought her down. She dropped without a struggle. The poor little one cried, "Hew! hew! hew!" and clung to the dead body sucking the breasts, burying its head there in its alarm at the report of the gun.

We hurried up in great glee to secure our capture. I can not tell my surprise when I saw that the nshiego baby's face was pure white—very white indeed—pallid, but as white as a white child's.

I looked at the mother, but found her as black as soot in the face. The little one was about a foot in hight. One of the men threw a cloth over its head and secured it till we could make it fast with a rope; for, though it was quite young, it could walk. The old one was of the bald-headed kind, of which I had secured the first known specimen some months before.

I immediately ordered a return to the camp, which we reached toward evening. The little nshiego had been all this time separated from its dead mother, and now, when it was put near her body a most touchiug scene ensued. The little fellow ran instantly to her, but, touching her on the face and breast, saw evidently that some great change had happened. For a few minutes he caressed her, as though trying to coax her back to life. Then he seemed to lose all hope. His little eyes became very sad, and he broke out in a long plaintive wail, "Ooee! ooee! ooee!" which made my heart ache for him. He looked quite forlorn, and as though he really felt his forsaken lot. The whole camp was touched at his sorrow, and the women were especially moved.

All this time I stood wonderingly staring at the white face of the creature. It was really marvelous and quite incomprehensible: and a more strange and weird-looking animal I never saw.

While I stood there, up came two of my hunters and began to laugh at me. "Look, Chelly!" said they, calling me by the name I was known by among them, "look at your friend. Every time we kill gorilla, you tell us: 'Look at your black friend!' Now, you see, look at your white friend!" Then came a tremendous roar at what they thought a good joke.

"Look! he got straight hair, all same as you. See white face of your cousin from the bush! He is nearer to you than the gorilla is to us."

And another roar.

"Gorilla no got woolly hair like we. This one straight hair, like you."

"Yes," said I; "but when he gets old his face is black; and do not you see his nose how flat it is, like yours?"

Whereat there was a louder laugh than before. For, so long as he can laugh, the negro cares little against whom the joke goes.

This little fellow lived five months, and became quite tame and affectionate. His only bad propensities were love of drink and a tendency to thieve. He would steal into bed with the negroes, and sit with them at the fireside, and delighted to eat with them.

As the dry season advanced, and the nights grew cooler, he became exceedingly fond of sitting near the fire with the men in the evening; Master Tommy seemed then to enjoy himself wonderfully, and quite as much as any human being. From time to time he looked up into the faces of those round him, as if to say, "Do not drive me away!" and the very white color of his face contrasted singularly with the black heads around him. His eyes were intelligent, and when left to himself his whole countenance had a look of sadness, sometimes painful to behold. Many times I tried to penetrate and read the inward thoughts of this wonderful little creature, which not only excited my wonder, out that of the natives. Tommy had a reputation quite as great as mine throughout the country. But alas! poor Tommy! One morning he refused his food, and seemed downcast, and was very anxious to be petted and held in the arms. I got all kinds of forest berries for him, but he refused all. He did not seem to suffer, but ate nothing; and next day, without a struggle, died. Poor fellow! I was very sorry, for he had grown to be quite a pet companion for me; and even the negroes, though he had given them great trouble, were sorry at his death.

The gorilla belongs to the class of quadramana or four-handed animals, the great toe being in fact a thumb, and so placed as to make a hand of his foot. He walks usually on all-fours, though he can walk erect in an awkward manner. Though he has immense jaws, he lives exclusively on vegetables. The animals live in pairs, though occasionally a morose old bachelor or widower is found living alone. The strength of the gorilla is enormous; with his arms he can break trees from four to six inches in diameter; and with one blow of his huge paw, armed with its long nails, he easily breaks the breast-bone of a man, crushes his skull, or tears out his entrails.

The Curative Effects of Grapes.

Dr. Herpin, of Metz, has published a very interesting account of the curative effects of grapes, in various disorders of the body. They act, firstly, by introducing large quantities of fluids into the system, which, passing through the blood, carry off by perspiration and other excretions, the effete and injurious materials of the body; secondly, as a vegetable nutritive agent. Employed rationally and methodically, aided by suitable diet and regimen, the grape produces most important changes in the system in favoring organic transmutations, in contributing healthy materials to the repair and reconstruction of the various tissues, and in determining the removal of vitiated matters which have become useless and injurious to the system. Directed by a skillful physician, this valuable curative agent can be made to produce the most varied effects on the constitution. It also possesses the advantage of being acceptable to invalids. —The treatment lasts from three to six weeks. The quantity of grapes that may be consumed varies from one to four pounds per day, commencing with small quantities, which are gradually increased. The skins and seeds must not be swallowed. In the absence of grapes, the most beneficial effects may be obtained from dried raisins, provided a quantity of water, sufficient to satisfy the thirst they create, be taken at the same time, or they may be stewed in the same manner as prunes.

A Simple Fly Trap.

A very cheap and efficient apparatus for exterminating flies, is made by filling a glass tumbler to two-thirds of its capacity with strong soap suds, and covering it with a slice of bread smeared on the lower side with molasses, and perforated in the middle with a hole the size of one's finger. There should be a little molasses through the hole and around its upper edge. For two or three hours very few flies will be caught, but after they begin to accumulate the liquid will soon be black with them. We can also recommend the use of fly paper, commonly sold by druggists. A few sheets of this paper laid upon earthen table plates containing water, will cause the death of every fly that touches it—and they will do it—only give them a fair chance.

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Exportation of Bees to California.

We have received from the publishers, H. H. Bancroft & Co., of San Francisco, an ocarvo volume of 440 pages, being a treatise by J. S. Harbison on the Theory and Practice of Bee Culture. It is illustrated by 47 lithograph and wood engravings, and seems to be a very complete work. The author is practically familiar with his subject, his life, so far, having been passed in the care of the industrious insects. We have transacted patent business for Mr. H. for many years, and we have ever found him familiar with the subject of bees. His hive was patented through this office.

We find the short chapter on the introduction of bees into California so interesting that we extract it entire :—

The introduction of the honey bee into California was an important event, and engrossed a large share of public attention; wherefore it is peculiarly appropriate to preserve as full a record of the transaction as possible.

The following letter from one of the earliest and most successful apiarists of this State contains an authentic account of the introduction of the first bees into California, as well as the success attending their first five years' cultivation in the San José Valley :—

SAN JOSE, Jan. 11th, 1860.

MR. J. S. HARBISON,

Dear Sir :—Yours of the 26th December, propounding certain inquiries, has been received.

The first bees imported into California was in March, 1853. Mr. Shelton purchased a lot consisting of twelve swarms, of some person to me unknown, at Aspinwall. The party who left New York became disgusted with the experiment, and returned. All of the hives contained bees when landed in San Francisco, but finally dwindled down to one. They were brought to San José and threw off three swarms the first season. Mr. Shelton was killed soon after his arrival by the explosion of the ill-fated steamer *Jenny Lind*. In December, two of the swarms were sold at auction to settle up his estate, and were bought by Major James W. Patrick, at $105 and $110, respectively.

Mr. Wm. Buck imported the second lot in November, 1855. He left New York with thirty-six swarms and saved eighteen. I purchased a half-interest in them. I also, in the fall of 1854, bought one swarm of Major Patrick, from which I had an increase of two.

Mr. Buck returned East immediately, and arrived in February, 1856, with forty-two swarms, of which he saved but seven. Our increase in 1856, from twenty-eight swarms, was seventy-three; we also had about 400 lbs. of honey in boxes, which we sold at from $1.50 to $2.00 per lb.

Mr. William Briggs, of San José, brought out, spring of 1856, one swarm, from which he had an increase of seven or eight swarms the following summer.

The above were the only importations I know of prior to the year (spring) 1857, which covers the ground of your inquiries.

There are in our county, at this time, about one thousand swarms.

Very respectfully, &c.,

F. G. APPLETON.

The first hive of bees ever in the Sacramento Valley was brought from San José in the summer of 1852 by Mr. A. P. Smith, the eminent nurseryman of Sacramento; they however soon died, which gave the impression that bees would not do well in this vicinity.

In this belief I did not concur, and therefore took measures to test the matter further.

In the fall of 1855 I sent East and had one hive of bees brought out, which arrived in Sacramento February the 1st, 1856. Though most of the bees had died or escaped from the hive during the passage, enough remained to prove that by careful handling they could be imported with little loss and that they would increase and make large quantities of honey when here.

I left San Francisco May 5th, 1857, on board the steamship *Golden Gate*, on my way East, for the purpose of preparing a stock of bees for shipping to California.

Sixty-seven colonies were preparing from my own apiaries, situated in Lawrence county, Pennsylvania.

They were taken to New York, and shipped on board the steamer *Northern Light*, which sailed from this port November 5th, bound for Aspinwall.

The bees were put on board in good order, were placed on the hurricane deck, kept well shaded and ventilated, and arrived at the latter port on the 15th of the same month, being ten days from port to port. Having arrived at Aspinwall in the forenoon, and ascertained that no passengers or freight would be sent forward before the next morning, I obtained permission to open the hives on the Company's grounds, and let the bees fly during that evening, which greatly relieved them, and contributed to their health during the remainder of the voyage.

The hives were closed up and placed on board the cars, crossed safely to Panama, and reshipped on board the steamer *Sonora*, which sailed from that port on the evening of the 16th, bound for San Francisco, where she arrived on the evening of the 30th.

The bees had ample stores within their hives before they were started, to last them through their long journey. I neither watered or gave any additional food during the whole trip, except what they obtained while flying out at Aspinwall.

During each day's confinement the bees labored incessantly to gain their liberty, but as soon as it was dark they always became quiet, and remained so during the night.

At San Francisco the bees were transferred from the steamer *Sonora* to the steamer *New World*, and landed in Sacramento on the morning of December 2d, 1857, thus terminating a journey of 5,900 miles, which was at that time the longest distance that bees had been known to be transported at one continuous voyage.

On opening the hives, I found that considerable numbers of bees had died in each, and that in five all were dead, having been destroyed by worms which had been hatched on entering the warm climate from eggs laid by the moth previous to starting. The combs were entirely enveloped in webs containing the worms, and were a perfect ruin. A few worms were found in each of the hives containing living bees, but were soon exterminated.

Some hives were found to contain so few bees that they were united with other weak ones, till the number was reduced to fifty.

In the latter part of January, 1858, I made a discovery which has since been verified in a number of instances. All the bees in two hives swarmed out, leaving them entirely deserted. On examining, I found young broods, the combs were clean and healthy, and each hive contained some six or eight pounds of honey. But it was nearly all sealed up, only a few cells containing honey being open.

The cause of the desertion was then a mystery, as they had apparently all the requisites to do well.

I finally suspected that, owing to their long confinement, and frequent passing over the sealed surface of the comb, it had become glazed so that the bees were not aware that they possessed so ample a store.

Acting from this belief, I at once with a knife uncapped a portion of the honey in each remaining hive; this was repeated twice a week for the following ones, and as the honey became scarce, feed was given to the most destitute. The result was that no more hives were deserted.

There was no indication of disease of any kind existing in any of them. Hence there is no doubt of the above being a cause of bees deserting their hives.

The stock was still further reduced by sale, so that thirty-four hives of bees remained on the first of April. These were increased to one hundred and twenty, most of which were sold in the summer and fall of that year.

Again, on the steamer of September 20th, 1858, I returned East, for the purpose of transporting another stock, which had been prepared for that purpose during the previous summer. On the 6th of December, in company with my brother, W. C. Harbison, I sailed from New York with one hundred and fourteen colonies, and arrived at Sacramento January 1st, 1859, with one hundred and three living. Of this importation, sixty-eight were from Centralia, Illinois; the remaining forty-six were from Lawrence county, Pennsylvania.

Owing to the lateness of the season of shipping, and unfavorable weather during the first three weeks after our arrival, we were only able to save sixty-two out of the whole number; these, together with six good hives remaining from the previous year, we increased to four hundred and twenty-two colonies, including the sixty-eight old ones; three hundred of them filled standard hives, and the remainder averaged half full.

The increase was all made on the artificial principle. Not a single natural swarm issued from any hive during the whole season. I also formed a large number of colonies, for different parties in Sacramento and vicinity, which were attended with like success.

During the time between the 1st of October, 1858, and April 1st, 1859, there were shipped from New York for California, over one thousand hives of bees, not over two hundred of which survived on the 1st of May of the latter year.

All but three of the parties engaged in shipping them lost money by the operation, many of them being unacquainted with the business.

Of the modes of importing bees to California, the most novel was that of Mr. J. Gridley, who brought four swarms across the plains from Michigan, placed in the rear end of a spring wagon. He arrived in Sacramento on the 3d of August, 1859, with them, in good condition. His plan was to feed them, and, in addition, stop occasionally in the afternoon and allow the bees to fly out and work till dark, when they were closed up to resume the journey on the following morning. This was repeated from time to time, as they required their liberty.

Notwithstanding such disastrous results attending the previous years' shipments, there were upwards of six thousand hives of bees imported during the winter of 1859–60. They arrived in better condition apparently than those of the previous year; yet, owing to the fact that large numbers of them were infected with the disease known as foul brood prior to their purchase and shipment, together with the effects of so long a voyage, probably one-half of the whole number were lost. Many of the remainder have since died, or now linger in a diseased condition, which is infinitely worse for the parties owning them than if all had died at once. Thus, the result was bad for all concerned; for, while some have lost their money, others have injured their reputation, besides paralyzing for a time an important branch of productive industry.

The Bashikouay Ant.

According to M. du Chaillu, one of the most formidable animals in the world is an ant which he found in Central Africa. He thus describes it :—

It is the dread of all living animals, from the leopard to to the smallest insect. I do not think that they build a nest or home of any kind. At any rate they carry nothing away, but eat all their prey on the spot. It is their habit to march through the forests in a long regular line—a line about two inches broad and often several miles in length. All along this line are larger ants, who act as officers, stand outside the ranks and keep this singular army in order. If they come to a place where there are no trees to shelter them from the sun, whose heat they cannot bear, they immediately build underground tunnels, through which the whole army passes in columns to the forest beyond. These tunnels are four or five feet underground, and are used only in the heat of the day or during a storm.

When they grow hungry the long file spreads itself through the forest in a front line, and attacks and devours all it overtakes with a fury which is quite irresistible. The elephant and gorilla fly before this attack. The black men run for their lives. Every animal that lives in their line of march is chased. They seem to understand and act upon the tactics of Napoleon, and concentrate with great speed their heaviest forces on the point of attack. In an incredibly short space of time the mouse, or dog, or leopard, or deer is overwhelmed, killed and eaten, and the bare skeleton only remains.

They seem to travel night and day. Many a time have I been awakened out of a sleep and obliged to rush from the hut and into the water to save my life, and after all suffered intolerable agony from the bites of the advance guard, who had got into my clothes. When they enter a house they clear it of all living things. Cockroaches are devoured in an instant. Rats and mice spring around the room in vain. An overwhelming force of ants kills a rat in less than a minute, in spite of the most frantic struggles, and in less than another minute its bones are stripped.—Every living thing in the house is devoured. They will not touch vegetable matter. Thus they are in reality very useful (as well as dangerous) to the negroes, who have their huts cleared of all the abounding vermin, such as immense cockroaches and centipedes, at least several times a year.

When on their march the insect world flies before them, and I have often had the approach of a bashikouay army heralded to me by this means. Wherever they go they make a clean sweep, even ascending to the tops of the highest trees in pursuit of their prey. Their manner of attack is an impetuous *leap*. Instantly the strong pincers are fastened, and they only let go when the piece gives way. At such times this little animal seems animated by a kind of fury, which causes it to disregard entirely its own safety, and to seek only the conquest of its prey. The bite is very painful.

The negroes relate that criminals were in former times exposed in the path of the bashikouay ants, as the most cruel manner of putting them to death. Two very remarkable practices of theirs remain to be related. When on their line of march they require to cross a narrow stream, they throw themselves across and form a tunnel—a living tunnel—connecting two trees or high bushes on opposite sides of the little stream, whenever they can find such to facilitate the operation. This is done with great speed, and is effected by a great number of ants, each of which clings with its fore claws to its next neighbor's body or hind claws. Thus they form a high, safe, tubular bridge, *through* which the whole vast regiment marches in regular order. If disturbed, or if the arch is broken by the violence of some animal, they instantly attack the offender with the greatest animosity. . . . Their numbers are so great that one does not like to enter into calculations; but I have seen one continuous line passing at good speed a particular place for *twelve hours*.

Improved Machinery and Wages.

The following remarks on this subject by the Glasgow *Herald* are so philosophic and convincing that they deserve to be circulated everywhere :—

The misconceptions which many working men entertain regarding the real effect of machinery on the price of labor are the main causes of turn-outs and strikes, and the rankling discontent which has been displayed towards employers, particularly in factory occupations. It is certainly of very great importance that the operatives themselves should be satisfied that improvements in machinery tend to raise the amount of their wages. This fact is demonstrated by the infallible rules of arithmetic, in the actual experience of thousands in many spinning mills; and it is here also proved that the improvements alluded to create a fresh demand for young persons, whose wages are augmented in consequence. In cotton-spinning it would now be possible for employers to reduce wages still lower than they have done since 1856, because there is always a sufficiency of hands; but it has never been the policy of employers to do so unless they are compelled by the want of profits. The prudent master of a fine spinning mill is most reluctant to tamper with the earnings of his spinners; and the main reason why they are so high is, that wages form but a small part of the cost of the manufactured article, and if they were reduced too low by a sordid master, operatives would become less careful, and thereby injure the quality of their work more than could be compensated by the saving in their wages.

The more complicated and extensive the machinery required for any manufacture, the less risk is there of its being injured by foreign competition, and the millowner has greater inducement and ability to keep up the wages of his workpeople.

MILK.—In this country we depend entirely upon cows' milk, if we except an occasional resort to asses' milk for invalids. But in other countries the milk of the goat, sheep, mare, camel, and rein-deer are utilized. Sheep's milk is a common beverage in Toorkistan, where the sheep are milked regularly three times a day. It is also used in Sweden and Denmark.—Goats' milk is used in Switzerland, reindeer's milk in Lapland. The milk of the camel is a very favorite drink in all countries where the animal is used. The quantity given by the camel, without green food, does not usually exceed a quart; but the Bactrian, which enjoys a more succulent diet, yields twice that quantity. Some of the pastoral tribes possessing large herds live almost wholly upon camels' milk during a great part of the year, and it is frequently given to favorite horses, which are extremely fond of it.

ORNAMENTING THE WALLS OF HOUSES.—A patent has lately been taken out in England by R. J. Cole, for ornamenting the outside walls of buildings in a peculiar manner with glass. The walls are first covered with a thin coating of cement, into which is to be imbedded glass, ornamented in stenciled designs, or by painting with oil or varnish colors in any desired device, and fixed in suitable frames; or the designs may be burnt in or transferred to the under surface of the glass, and fixed to the walls or partitions as above described. In some cases, it may be desirable to have the device painted in fresco or otherwise on a properly prepared wall or partition, and then to cover such design with plain or colored glass, so as to present an ornamental exterior, protected by the surface of glass from atmospheric and other influences.

PROFESSOR HUNT, of England, asserts that the internal heat of the earth does not increase in the same ratio at great depths as near the surface; and he attributes the heat, not to internal fires—as is most generally believed by men of science—but to chemical action going on among the rocks.

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Improved Steam Superheater.

It is generally admitted by American as well as European engineers, that superheated or pure dry steam of a temperature that will not injure the packing or cylinder of the engine, is a great desideratum on the score of utility as well as of economy.

The superheater here illustrated, which was invented by S. N. Carvalho, has for its object the production of a continuous supply of pure dry steam at any temperature required. We made mention of this invention some months ago, but did not consider it prudent, in 'consequence of pending applications for European patents, to publish a minute description of it. The patents being now secured, we give an illustration which will make the apparatus intelligible to all engineers.

It is well known that steam coming in contact with red-hot iron is decomposed; the oxygen of the steam combining with the iron to form oxyd of iron, and the hydrogen being set free. Then if the hydrogen thus liberated is brought in contact with the oxyd of iron, the oxygen leaves the latter and combines again with the hydrogen, forming steam and leaving the iron in its original condition.

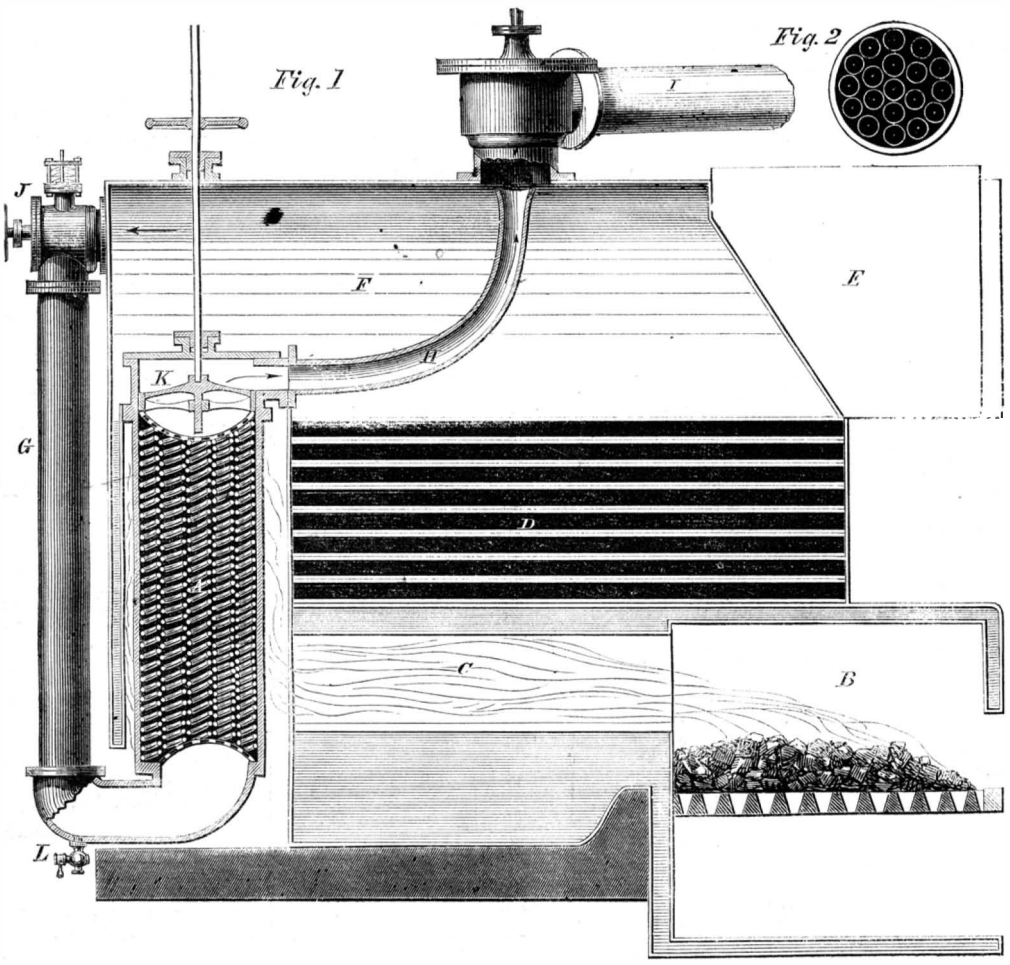
It is stated by chemists of the highest authority, that these two changes take place at the *same temperature*, Kane calling it an apparent paradox and Fownes offering an explanation.

"It is," says Mr. Carvalho, "on this nicely adjusted balance of chemical affinities that my invention is based. I introduce equal quantities of metallic iron coils of wire and oxydated iron coils of wire into the superheater, when two processes diametrically opposed to each other go on, viz., decomposition and recomposition of steam, until the temperature of the retort is reduced below the decomposing heat. This is practically illustrated by placing a pipe filled with wrought iron filings over a furnace, and allowing a volume of steam to pass in at one end of the pipe, when from the other will issue hydrogen gas, which is inflammable and will burn in contact with flame. When hydrogen ceases to come out, the iron is oxydated, and may easily be broken. But if the two kinds of iron are placed in the tube, viz., protoxyd and metallic iron turnings, and the volume of steam is introduced while over the furnace, steam will escape and not hydrogen gas.

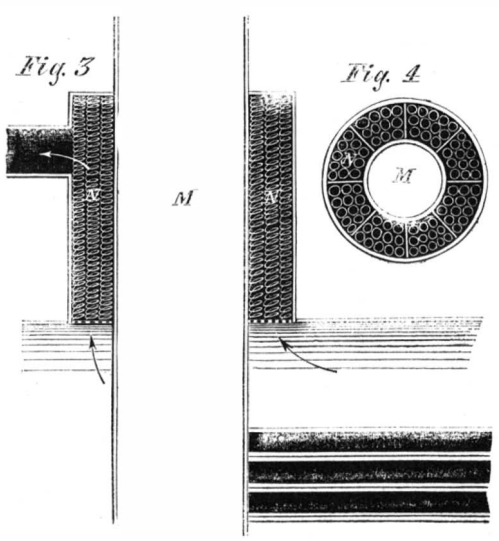
"The arrangement of the apparatus will be understood by examining the engraving.

"Fig. 1 represents it as placed in the back connection of the boiler of the steamboat *Louisiana*, in Baltimore. The superheater, A, is a hollow cast-iron cylinder filled with the coils of iron wire, Fig. 2 representing a horizontal section. The flames from the furnace, B, pass through the flue, C, around the superheater and back through the tubes, D, to the stack, E. The steam passes from the upper part of the boiler, F, in the direction indicated by the arrows into the pipe, G, through which it descends into the lower end of the superheater; thence it passes upward through the coils of wire and through the pipe, H, into the pipe, I, which leads to the cylinder. The pipe, I, communicates directly with the steam in the upper part of the boiler by an annular opening around the end of the pipe, H, and a valve, J, closes the communication between the boiler and the superheater, so that by simply shutting this valve, the engine may be worked by steam directly from the boiler, without passing the steam through the superheater. The opposite end of the superheater is closed by the valve, K. Any heat radiating from the pipe, H, passes into the steam in the boiler and is thus saved. The stopcock, L, is provided for letting off the water of condensation.

"Figs. 3 and 4 represent a simple and cheap adaptation of this apparatus to the steam chimney of an ordinary boiler. The steam chimney, M, is surrounded by a cylinder, N, sufficiently large to permit the introduction of the wire coils between the walls of the two; these coils resting upon the perforated plate, Fig. 4, which surrounds the steam chimney and lies upon the top of the boiler. The coils absorb the heat and conduct it into the steam space, thus superheating the steam, and at the same time they prevent the oxydation of the steam chimney.



CARVALHO'S STEAM SUPERHEATER.



"The metallic iron wire having a greater elective affinity for oxygen than cast iron, the oxydation goes on with it while the sides of the retort remain unchanged. A superheater erected on the boiler of the the engine at the Ordnance Department, in Washington, a year and a half ago, was taken out by order of the Chief Engineer, and thoroughly examined after one year's use, when it was found in a perfect state. It was replaced, and continues to supply pure dry steam at a saving in power and fuel of at least 25 per cent according to the official report of Mr. M. E. Bright, the Chief Engineer of the Navy Yard.

"The coils of wire serve two purposes, viz., the preservation of the superheater from oxydation and the conducting of heat from the sides of the retort, the steam being thus distributed over a much more extensive heating surface, is improved in proportion.

"All the damage to ordinary superheaters is done at the instant and for a very short time after the introduction of steam to the heater, which being previously empty, absorbs sufficient heat to decompose the steam, but a continuous volume of steam rapidly passing through it cools it below a decomposing temperature.

"Prof. W. E. Aiken, of Maryland, testifies 'that there cannot be any shadow of doubt as to the accuracy of the scientific principles involved in Mr. Carvalho's apparatus. Neither is there any room to doubt the correctness of his mode of applying those principles for preventing the rapid oxydation of an iron superheater exposed to a high degree of heat on one side, and to the gases of decomposed steam on the other. Mr. Carvalho's method cannot fail to produce pure dry steam at a high temperature, only limited by practical considerations.'"

We have devoted a large space to the explanation of this invention being an improvement which seems to be of much importance to those who use steam as a motive power. In Europe superheated steam is generally employed on vessels going long voyages. An economy of fuel equal to 33 per cent in coal has been effected, the vessel being thus enabled to carry one-third more cargo instead of being filled up with coal.

Mr. Carvalho has also introduced his method with great success for boiling sugar in open pans in Louisiana, where before ordinary steam was used.

At this time, when economy of fuel and increase of steam is so much required, we recommend our naval engineers, and such manufacturing companies as prefer the use of pure dry steam, to investigate Mr. Carvalho's invention.

Patents for this invention in Europe were procured through the Scientific American Patent Agency; the American patent bearing date Jan. 3d, 1860. Communications in relation to it may be addressed to S. N. Carvalho, care of D. Wolff, 74½ Pine street, New York.

Mercantile Library Association.

We have received the Fortieth Annual Report of this excellent institution, and take pleasure in calling the attention of our readers to its advantages. The rooms are in Clinton Hall, Astor Place. The terms of membership, including both library and reading room, are, to clerks, one dollar initiation fee, and one dollar semi-annual dues. To all others, five dollars a year. The library now contains over fifty-seven thousand volumes, and additions of new works are constantly being made. It is open from 8 A. M. to 9 P. M. The reading room is regularly supplied with one hundred and seventy magazines, and one hundred and forty newspapers. Subscriptions to the reading room alone three dollars a year. Open from 8 A. M. until 10 P. M.

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NEW YORK, SATURDAY, AUGUST 24, 1861.

INFORMATION AS TO THE PATENTABLE NOVELTY OF INVENTIONS.

The list of claims published from week to week in these columns, indicate truthfully the extent of business being transacted at the Patent Office.

It will be observed that inventors are far from being dormant, if they are not as numerous and active, as they were a year ago. Since the first of July we have received a great accession to our subscription list of new subscribers, and for the information of each, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a drawing and description or a model of the invention should accompany the remittance. Address—

MUNN & Co., No. 37 Park-row, New York.

HEATING AND LIGHTING CITIES BY THE POWER OF THE TIDES.

Sir Humphrey Davy once remarked that people need have no anxiety in regard to the exhaustion of the coal mines, for long before that was effected some cheap mode would be discovered of decomposing water, and this would furnish an unlimited supply of fuel. This prophecy is already accomplished. If all the coal mines in the world should spontaneously take fire and burn up, it is now in the power of science and art to extract boundless quantities of heat and light from the rivers and seas. By magneto-electric machines water may be decomposed without any expenditure except that of mechanical power, and some recent improvements in these machines, by which their power of decomposition has been greatly increased, have suggested this article.

In a recent number we pointed out the superiority of hydrogen over all other substances for heating purposes, and on page 280, Volume 3, is an illustration of the apparatus by which this gas is produced for the purpose of lighting the city of Narbonne. As hydrogen can be obtained in unlimited quantities merely by mechanical power, we have only to make suitable arrangements to avail ourselves of the great forces of nature in order to get all the fuel and light we want, without any current expense whatever, except the trifling one of keeping the apparatus in order.

The tide, as it sweeps through Hell Gate four times in the 24 hours, probably exerts sufficient power to turn enough magneto-electric machines to decompose water and furnish hydrogen for all the mechanical and domestic purposes for which fuel and light are required in this city!

Here is an opening for a discovery which will be eminent among the marvels even of this wonderful age. In place of the enormous expenditure at present incurred for fuel and gas, our steam engines may be driven, and our dwellings may be warmed and lighted by the perpetual and undiminishing power of gravitation.

NEW SIDE-WHEEL WAR STEAMERS.

In addition to the twenty-three screw gun-boats which are now being constructed, Congress passed an act, on the 3d inst., authorizing the building of twelve new side-wheel steamers of light draft, intended for cruising in the sounds and along the southern coast, which is quite shallow for a long distance out from shore. The Navy Department, in conformity with the act authorizing the building of such vessels, has invited proposals, which will be received up to the 5th of next month, so that those who intend to compete for them must be "up and doing," so as to prepare their specifications and submit them for decision, in due season.

The load draft of water must not exceed six feet nine inches. Each vessel is to be armed with two rifled guns of 7,000 lbs. each—one at the bow and the other at the stern; also two 12-pounder howitzers. The vessel must have the capacity of carrying provisions for sixty days; 2,000 gallons of fresh water, and a condenser for distilling water for cooking. It must be schooner rigged, with a rudder at each end, protected by a post.

The Navy Department desires that these vessels shall have the highest attainable speed, and those who propose to construct them must state the speed which they are able to give, with the the quantity of coal for that speed, and a sufficient amount must be contained in the bunkers for eight day's steaming. In the construction of these vessels the diversified and original genius of our steamboat builders is allowed considerable range. Certain qualities are demanded for each vessel, the principal of which are light draft of water and great speed. The reputation of successful steamship builders will have due weight with the Navy Department, as bidders, and the name of the engineering establishment at which the machinery is to be made, must be stated by those who apply for the contracts. A guarantee will be inserted in each agreement for the fulfillment of the condition of speed, the quantity of fuel, and satisfactory working of the machinery, &c. These steamers will be required to ascend creeks where schooners of the very lightest draft find access, hence the necessity for having them built with side wheels. The machinery of propellers is less exposed to shot than that of side-wheel steamers, but it is impossible to obtain a light draft and a high speed with a screw. It is well understood by ship builders that a side-wheel steamer of the same capacity as a propeller will draw about three feet less water, hence the advantage of side-wheels for shallow coast cruising.

CARRYING PARCELS IN TUBES.

It is more than thirty years since it was first proposed to convey letters and parcels in vacuo through long tubes operated by a steam engine, but so far as we know, the first practical apparatus of this character exhibited was that of I. L. Richardson, of Boston, which was illustrated and described on page 265, Vol. 8 (old series), SCIENTIFIC AMERICAN. It never was employed on a large scale for public purposes, but it was operated very successfully with a limited model, through half a mile of tubing, if we recollect correctly. Such a mode of expressing parcels is perfectly practicable; the only question in reference to its adoption, is that of the expense incurred in its operation.

In large cities we believe such a system could be maintained with profit, because the tube lines required would be quite short, while the business to be transacted would be large. The Londoners appear to have practical views of this question, as a Pneumatic Dispatch Company has been formed in their city, and our cotemporaries, *The Engineer* and *Mechanics' Magazine*, contain accounts of experiments on a rather large scale, which have lately been made for testing this peculiar mode of transmitting parcels, and an interesting narrative of these experiments will be found upon another page. This system deserves very general attention, as the London experiments afford reasonable grounds for concluding that it will yet become a permanent institution, like railways and the electric telegraph.

If we had such a system in New York, packages could be deposited at various stations throughout the city, communicating by tubes with the principal railroad and steamboat depots, and thus our streets would be delivered from interminable rows of carts and the turmoil and confusion which they cause. Perhaps there is no city in the world that would reap greater benefits from such a system successfully carried out. It would in a great measure, if not entirely, preclude the necessity of constructing either an elevated or a subterranean railway for the relief of Broadway and some other thronged streets.

THAT FORGED LETTER AGAIN.

In our last number we published a letter purporting to have been written by us to some one in New Orleans, respecting a grand patent scheme in the Southern Confederacy. This letter and some comments peculiar to that section first made its appearance in a Southern journal, and has since been copied into some Northern newspapers. We have denounced this letter as an infamous forgery so far as we have been able to follow its track of publication; but as lies always travel faster than the truth, we shall not expect to keep up with it.

If any of our readers should notice the letter referred to in any newspaper that comes under their notice, they will confer a special favor by sending a marked copy to us, in order that we may apply the corrective.

The miserable vagabond who perpetrated this infamous libel upon our loyalty and integrity is no doubt beyond our reach, but if we had him where justice could be meted out to him as he deserves, he would soon find himself in a tight place. Newspapers publishing the letter are guilty of libelling us grossly.

GENERAL McDOWELL'S REPORT.

We presume most of our readers have read the official report of General McDowell of the battle of Bull Run. It is a calm, clear and candid report, and does credit to this brave officer.

Gen. McDowell believed that up to a certain point in the contest that a victory had been won by the Union troops; and furthermore, that if the battle had been fought a day earlier, and in accordance with the plans laid down when the advance of the army began, that his success would have been complete.

The reinforcements that came in from Gen. Johnson's column from Winchester turned the scale of victory in favor of the secessionists—this could not have been accomplished at an earlier date. The statement of Gen. McDowell is fully corroborated by Southern authority. G. B. Lamar, now a secessionist, but formerly President of the Bank of the Republic, in this city, in a letter just published, says:—"The enemy thought, up to 4 o'clock, they had the victory—*and so they had;* but the opportune arrival of two fresh regiments turned the battle and gave us a glorious victory."

This is good evidence that the Federal troops, though fighting against serious odds, and under the fire of masked batteries, carried the battle up to the point of the arrival of fresh troops from Winchester.

Gen. McDowell's report, and his conduct upon the field, shows that he was a brave and faithful officer, deserving the confidence of the people.

ANIMAL charcoal broken in small pieces about the size of beans, is allowed to be the best filtering medium for water in the world. Ordinary rain water filtered through this medium becomes as pure as distilled water.

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A BRITISH OFFICER ON RIFLED ORDNANCE---ROUND SHOT.

A lecture was delivered on the 27th of June last, by commander Scott, R. N., at Davenport, England, before a large audience mostly composed of military and naval officers in government employ. He asserted at the outset that battles had generally been decided at close quarters and ever would be, and although artillery had now acquired longer ranges by rifling the guns and using elongated shot, the change was merely one of degree, not of system. The modern improvements in ordnance will not materially influence the distance at which actions will be fought and decided. Sir Wm. Armstrong long ago stated, in a paper to be found in the "Transactions of Civil Engineers," that "the real struggle would always be within a distance of 2,000 yards, and the great object should be to make weapons as destructive as possible within that limit."

Capt. Scott stated that an unfavorable opinion had prevailed respecting cast-iron as being unfit for rifled ordnance. This was an erroneous idea, which had arisen from the faultiness of the shot employed for such guns. A tight-fitting cast-iron shot had been used for the purpose of closing the windage; this was the cause of several cast-iron rifled guns bursting, because the shot had been slightly upset—compressed in the gun. Improvements, however, had lately been made in rifling cast-iron guns, and by using his shot, there was no danger from bursting. This consisted of an elongated cast-iron conical bolt, having three shoulders, which fitted into grooves, and was perfectly centered in the bore. There was no outward pressure caused by its expansion against the gun, and the friction was so small that no trace of wear in the grooves could be observed after firing 300 rounds of shell.

In England, the Lancaster system of rifling with an oval bore was first tried with cast-iron guns in actual service during the Crimean war, but it failed from certain defects, it is believed, in the mode of making the shot. This caused cast-iron rifled ordnance to lose credit. Sir Wm. Armstrong's gun is finely grooved and built up of wrought-iron coils welded together—a plan identical with that of Capt. Blakely, which had been previously patented. Such guns, when of large caliber, are not the best for naval purposes. Capt. Scott asserted that at short distances, no elongated shell had yet surpassed a 68-pounder ball, and as the round ball caused incomparably less strain on the gun, and could be loaded more rapidly than an elongated shot, the latter should be abandoned for short ranges. He asserted that the best and most economical course for the British government to pursue in arming the navy, was to rifle all the smooth-bore cast-iron and brass guns in the arsenals and dockyards, use elongated shell for long distances, and finish the action with round shot at close quarters. Commander Scott is a naval gunnery officer, and his opinions on such an important question deserves general consideration, because he is devoted to it as a specialty.

INQUIRY ABOUT THE USE OF EXTENDED PATENTS.

A correspondent asks the following question:—Where an assignee of a patent sells to the government the right to use the invention (being an improved method of making and working a sail) on government vessels, for the fourteen years, and afterwards the inventor obtains an extension of the patent, can the government continue to use the invention after the expiration of the fourteen years? We answer, that it cannot, unless the inventor, in the assignment to the assignee, expressly and plainly includes the right to use the invention during the extended term, should there be one, nor unless the assignee also plainly includes this right in his sale, or more properly license, to the government. In case both these things were done the government would have such right.

There is one exception, however, to this rule, which applies to all *licenses*, namely, that all existing sails in this case, or other patented subjects in other cases, made or used under a license for the fourteen years, may be freely used after the extension, till they are worn out, although others used after the extension must pay the patent fee.

If a vessel in the merchant marine, which merely buys the right to use the invention for the fourteen years, attempts to use it "for all time," all that need be said is, that it is an infringement of the inventor's rights, under his extended patent, for which an action would lie.

The fact of the government buying a right, "to use the invention *on any one or all* of its vessels," during the fourteen years, makes no difference. The terms of the grant, or license, as above stated, are to govern the use, and the government can have what it clearly buys and no more. If it buys the right to the extension of the rightful owner (and it must always be from the inventor directly or indirectly) it has it—otherwise it has not.

Our correspondent intimates, without seeming to be aware of it, another more important and difficult point than the above, and one on which the question of the extension of the Ketchum patent, recently considered by us, mainly turned. He puts the case of "a patentee assigning his patent to a purchaser, supposing that by so doing the exertions of the purchaser will bring it into general use, so that, at the expiration of the fourteen years, the original patentee, by securing an extension, may realize something valuable by his invention."

Now, it was held in the Ketchum case that this is the very state of facts which would prevent an inventor from obtaining an extension. This is to be granted *to him* as a "reasonable remuneration for the time, ingenuity and expense bestowed upon the same, *and the introduction thereof into use*," (eighteenth section of Patent Act of 1836.) No amount of "time, ingenuity, expense and introduction into use" of the assignee will avail. It was held in the above case that the remuneration is to the inventor, and the acts entitling him to it must be performed *by him*, and not by another, and that the performance of the acts is a condition precedent to receiving the remuneration. The greatest difficulty in Ketchum's case, in the Commissioner's mind, *as it was presented*, was, that he sold out his patent before he had introduced the invention into use, and, though the assignee had introduced it so extensively that he realized a profit of $1,400,000 from it, the objection that Ketchum himself had not *sufficiently* introduced it was held fatal.

Inventors ought to bear this in mind, in reference to all patents under the old law, and use great caution in making sale of them, if they expect to apply for an extension.

We feel bound to say, however, that though the present Commissioner of Patents has adopted the above rule, we much doubt whether it is the true construction of the statute. But for all practical purposes the law is what the tribunals which, for the time being, administer it declare it to be, and not what wiser men, or men less wise, think it to be.

STABLE AND CHANGEABLE COLORS.---FRAUDS.

A paper was lately read before the Paris Academy of Sciences, by M. Chevreul, in which he directed attention to the importance of classifying colors on goods and giving them correct names, so as to afford more security to merchants and the public without interfering with the freedom of business. Instead of the vague and useless names of colors now applied to goods, he proposes that their qualities of endurance shall be as follows:—*Very stable*, *stable*, *moderately stable*, *changeable*, expressed in degrees according to the time which these colors will endure when exposed to light and air. Indigo and madder are about the only substances known which produce very stable colors with certain mordants. Cochineal and weld produce stable colors, Brazil and Campeachy woods are moderately stable; annotto, turmeric and safflour produce fugitive colors.

M. Chevreul regrets that the new muroxyd and aniline colors should have been so much over-praised. They are beautiful and agreeable to the eye when fresh, but they soon fade when exposed to the sun. The old stable colors obtained from indigo, madder, cochineal and weld, will remain in favor and be applied in manufactories, when their new rivals will have disappeared. Great deceptions are frequently practiced in the coloring of cloth.

A regiment belonging to this city lately returned after three months' service, and the blue coats of all the companies but one, seemed to be about as bright as they were on the day the men left. The exceptional company had not been in service over eighteen weeks, as it was a reserve raised after the body of the regiment had gone to Washington; and all the coats of this company were entirely new when the men went away, and they were of a deep rich blue color, but they had become a dirty drab color on the shoulder and all the parts that had been most exposed to sun light. This cloth had been colored with logwood instead of indigo, and it was a fraud, as logwood can be applied for one-fourth the cost of indigo at the very most. Such frauds should be traced to their source and the guilty parties made to disgorge.

Mechanics and Patents at the South.

To our Machinists.—We do hope that our machinists and mechanics will get at once to work, and manufacture such machines and implements as we have been supplied with by Yankee patentees for years past. There are plows, corn shellers, straw cutters, and other articles of daily use among us, that may now be made at rates which while comparatively moderate to the purchaser, would yield a good profit to the manufacturer.

We cannot see why the various printing presses in use among us might not be built by our machinists. The Adams's press, Hoe's cylinder and those of other Northern makers, are now in almost universal use at the South, and, all being patented, have made fortunes for the Northern manufacturers.

The above notice appeared some time ago in a South Carolina journal. All patents granted by the United States government give the patentee exclusive right to make, use and sell his invention in all the States alike. By the act of secession and the breaking up of the Federal Courts in the seceded States, the patentee's rights are now placed in those States at the mercy of infringers, who are now invited to appropriate the fruits of the genius of others with impunity. Inventors, as a class—North and South—are loyal. They cannot look on with indifference and see their rights freely appropriated by those who have neither a moral nor a legal claim to justify their acts. By the establishment of the Federal authority in all the States it secures to patentees the fullest protection under their patents, and insures the punishment of all infringers. It is a well ascertained fact that several of the most notorious infringers of patents, whose names have figured extensively in our courts, are now South watching a chance to prosecute their nefarious schemes of piracy.

Has the Scientific American proved recreant to the interests of inventors and patentees in endeavoring to uphold the government? Let our readers ponder well the paragraph quoted above and answer the question.

There is, however, another view of this matter which we will briefly present. A newspaper can, in a few words, urge upon its readers to engage in the manufacture of machinery, but it is quite another matter to bring this about. Manufacturing and the mechanic arts have not hitherto flourished in the Southern States—the people are agricultural, and their peculiar system of labor is not attractive to mechanics, and under the most favorable circumstances it must require many years before these branches of industry can flourish in those States.

Protest Against Humanity.

The Charleston *Mercury* is greatly displeased that the Union prisoners at Richmond should be treated with any degree of humanity. Referring to the subject, in its number of the 3d instant, the *Mercury* says:—

We have been provoked beyond endurance by reading the most complacent and gratulatory comments of certain Virginia papers, on the charming charity and benevolence of certain citizens and officials of that State towards the invaders of their soil, plunderers of their estates, destroyers of their homes and firesides, &c. We demand that every prisoner in Richmond be incarcerated and put in irons. Justice, humanity and civilization alike cry aloud for a stern retribution.

Such is the spirit of this organ of sulphurious fires. For years this journal has vomited forth fire and brimstone upon all who thought best not to heed its counsels. It is one of the many instrumentalities in the hands of Satan that has brought this dire mischief upon the country. The people at heart are not enemies, but it has pleased violent demagogues and bitter partisan newspapers of both sections to rub the dear people by the ears and set them to fighting.

The best known alloy fusible at a very low heat, is composed of 15 parts of bismuth, 8 parts lead, 4 tin, 3 cadmium. It is silvery white in appearance, and melts at 140° F'ah. It can be used as a solder for metals not exposed to a high temperature; and it is superior to cheap quicksilver amalgam for fillnig teeth.

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Correspondence

The Caloric Engine on Sugar Plantations.

MESSRS. EDITORS:—On looking over volume II, new series of the SCIENTIFIC AMERICAN, I found, on page 122, in an article on "Caloric Engines," the following;—"We are informed that the company engaged in the manufacture of these engines have recently supplied a double motion of this character to drive the sugar mills of an extensive Cuban plantation. It has given the best satisfaction," &c.

Now this would give one the impression that hot air, as a motive power, would soon supersede steam, for a power that will drive a sugar mill will drive almost anything. But as I happened to be on a plantation near the one having the "caloric," I thought I would give you a few facts concerning it.

The first engine put on this plantation was a double one of 24 inches cylinder; but this was a failure, for it was altogether too small to crush the cane. In fact it did not do as good work as the "Old Bull Mill" that had been used previous to this. So the company agreed to take this off and put on another that would do the work. This was set up last fall. It was made expressly for this place; the cylinders were 48 inches in diameter (four times the power of the first one), and yet it failed to give satisfaction to the owners of the plantation. It was continually getting out of order, and required the engineer to be in constant attendance, although one of their greatest recommendations to the planter was, that any of his negroes could run it, and thus save the pay of an engineer. The mill attached to this "motor" was the size that used to be sent with a steam engine (single), cylinder 10+42.

The amount of sugar made last season on this "extensive plantation" was five hundred boxes, while there is a plantation in that part of the island that made three thousand boxes with a steam engine of 12 inch cylinder and 4 feet stroke.

Now, from what I have seen of the Caloric Engine, I agree with you in saying that "for a safe, economical and convenient power for the smaller purposes of business, it does well," but for large powers, or where the whole power of the engine is used to drive a single machine like a sugar or rolling mill, it is not reliable, and, as yet has failed to prove itself so. I am not hostile to the Caloric Engine, but I like to see things stand on their own merits, and knowing that your intention is that your paper shall be one of truth and fairness, I have taken this occasion to post you up in regard to the first application of the Caloric to drive sugar mills. B. H.

Dover, N. H., Aug. 2d, 1861.

Fairbairn's Rollers.

MESSRS. EDITORS:—In a late number of the SCIENTIFIC AMERICAN, you copy from *Newton's London Journal of Arts and Sciences*, an account of an improvement in rollers for preparing flax, and which is ascribed to Fairbairn, supposed to be the well-known manufacturer of flax machinery in England. These rollers are excellent, much better than the wood rollers in general use. I saw them in use at the Golding bagging factory in Louisville, Ky., more than twenty years ago, and about ten years ago I used the same successfully as rollers for drawing frames, while connected with a company in your State, where we demonstrated that linens could be made as cheap as cotton goods. O. S. LEAVITT.

Richmond, Ind., August 6, 1861.

To Make Elderberry Wine.

MESSRS. EDITORS:—As it will soon be time to make elderberry wine, I will give you my experience on the subject.

Four years ago this fall, I made three barrels of this wine, and in doing so, tried several experiments. I made a certain quantity with the pure juice and sugar, another portion with two quarts of water to one of pure juice, a pound of sugar for each quart, then boiled the whole together. Neither of these two modes produced a wine equal to the following:—To one quart of juice I added three quarts of water, four pounds of sugar, and a tablespoonful of yeast to the gallon. This I put into a cask in a cool situation, and kept it full. It soon fermented, and the froth was discharged from the bunghole. The cask must be examined during fermentation, and a free vent given to prevent it from bursting. An open vessel will also answer for fermenting the juice, but its surface must be frequently skimmed. When fermentation is nearly completed, the cask should be "bunged up," or the wine placed in bottles and tightly corked.

I pressed my berries in a crib made of strong slats. About half a bushel of berries, with their stems, were placed in the crib at once, and a jack-screw soon pressed out the juice. The wine was very good to use during the succeeding winter. I have found that boiling the juice of berries, as practiced by some persons in making wine, spoils the flavor completely.

H. B. N.

Hiram, Ohio, August 12, 1861.

PROPOSALS FOR IRON-CLAD STEAM VESSELS.

The Navy Department has invited proposals for building one or more iron-clad steam vessels of war. Offers from parties who are able to execute work of this kind will be received for 25 days, from the 15th of this month, and evidence, with these offers, must be furnished of ability for the construction of such vessels having the following qualities:—Each must be made wholly of iron, or of iron and wood combined, for sea or river service, and to be not less than ten, and not over sixteen feet draught of water. It must carry an armament of from eighty to one hundred and twenty tuns weight, with provisions and stores for from one hundred and sixty five to three hundred persons, according to armament, for sixty days, and coal for eight days. The smaller draught of water, compatible with other requisites, will be preferred. A general description, with drawings of the vessel, armor and machinery, such as the work can be executed from, will be required

These proposals are different from those which were issued for the new propeller gun boats. The drawings and specifications for the hulls and their machinery were executed and furnished by the Navy Department, and the contractors are only required to follow the specifications. The proposals for the iron-clad vessels are defective in one important feature, namely, the object and aim of the iron clothing. It is not specified whether it shall be one, two, or ten inches thick; or whether it shall be able to resist shell or solid shot. No doubt the aim of the Navy Department is to secure iron-clad vessels which shall have upper decks and sides capable of resisting shell and solid shot, and those who intend to propose for the construction of such vessels, should be very particular in specifying the quality of the iron and the thickness of the plates. Such vessels could be built in Great Britain at less cost and much sooner than they can be executed here, but we judge it is the intention of the Navy Department to confine the proposals to our own shipbuilders and engineers. The very limited draught of water required—the maximum being only sixteen feet—is positively necessary, because the inlets and harbors on our entire Southern coast, with a very few exceptions, are quite shallow. All above the water line, and for about two feet below it, in each vessel, should be covered with 5-inch plates; but below this, where it is not exposed to shot, may be built, we believe, of 1-inch plates, forming a cellular under-hull, comparatively light, but possessing great strength and buoyancy.

Improvement in Making Steel.

Mr. R. Mushet, the well known English manufacturer of steel, has lately obtained a patent for improvements in alloying titanium with blister, bar, puddled and any any other description of steel. The principle of the invention consists in fusing some of the pulverized ores of titanium with steel cut into small pieces, placing the whole in a suitable furnace or crucible, containing ground charcoal, and submitting them to a high heat until smelted and the whole has become a homogeneous mass. The impurities are then skimmed from the surface and the molten steel poured out into ingot molds, when it is found to be a superior quality of cast steel. Malleable iron treated with titanium, or any titanic ores in the same manner, makes an improved quality of steel, and thus from cast iron good steel may be manufactured.

Novel Experiment of Transmitting Goods Through Tubes.

The London *Mechanic's Magazine* gives an account of some experiments recently made on the right bank of the Thames, with a view of testing the efficiency of tansmitting goods and parcels proposed by the Pneumatic Despatch Company. The mechanical arrangements in connection with the experimental line of cast-iron tubing—which, like a huge black snake, stretches for more than a quarter of a mile along the river side—are few and simple. Under a temporary shed a high-pressure steam-engine of thirty horse power, made by Watt & Co., and having its cylinder placed at an angle of forty-five degrees, is erected and it gives direct motion through the medium of a crank to a large disk of sheet iron.

The disk runs on tubular bearings, and narrows from about 2 feet 6 inches in breadth at its center to 3 inches at its circumference, its diameter being 18 feet. Its interior contains simply four arms, to which the sheets of iron are fastened, and which serve as fans or exhausters. Through the hollow bearings, upon which the disk is made to rotate at a speed of from 150 to 200 revolutions per minute, a communication exists with a vacuum chamber below, and by the laws of centrifugal action the latter is speedily exhausted to a certain extent of air. The speed, in fact, of the disk determines that extent, and a water barometer registers it. The air rushes out with considerable force from the periphery of the disk. Between the vacuum chamber and the pneumatic tube, which is 2 feet 9 inches high, by 2 feet 6 inches in breadth, and a transverse section of which resembles that of the Thames Tunnel, there are fitted valves with hand levers for opening and shutting them. These may be said to comprise the whole of the motive and propelling agencies of the pneumatic system.

The tube has been laid down in Battersea Fields, in such a manner as to test severely the practicability of the scheme. It has several very sharp curves and steep gradients throughout its length, and is socket jointed, so as to leave its interior, which is just as it came from the sand, free from obstruction. The carriages are five feet in length, of sheet iron, and each runs upon four cast iron wheels of eighteen inches in diameter. The rails—so to speak—are cast in the bottoms of the tubes, and require, therefore, no "laying" but that which the setting of the tubes themselves gives them. A few strips of vulcanized india-rubber screwed round the circumference of the fore end of the carriage constitute the piston. This, however, by no means closely fills the tube. In fact, there is fully three-eighths of an inch clear between the exterior of the piston and the interior of the tube.

There is no friction, therefore; and, singular to say, the leakage of air does not interfere with the speed of transit. This can only be accounted for by the large end area which the carriages have, in comparison with the small area of leakage space and the comparatively low vacuum required. The first experiment made was by loading a carriage with one tun of cement in bags, and entering it into the open end of the tube. Upon a given signal the engineer to the company caused the starting valve to be opened, the water barometer showing a column of seven inches in height, and the disk running at the rate of one hundred and fifty revolutions per minute.

In fifty seconds later the carriage with its contents found its way into the engine house, through a door at the end of the tube, which it forced open, and then ran forward on rails to a butt placed to stop its progress. Next two tuns weight were placed in one of the cariages, and its transit occupied eighty seconds, under similar circumstances. The vacuum was now lowered until the barometer gage showed two inches of water only, and a living passenger, in the shape of a not very handsome dog, was placed with one tun weight of dead stock, in a carriage. The signal was made by the workmen at the open end of the tube, the communicating valve was opened, and in one minute and a half the carriage and its four legged guard were in the engine house, the latter apparently not at all the worse for the exhausting process to which he had been subjected.

THREE commanding Generals, Bartow, Bee and Smith, and four leading secession editors, were killed at the Bull Run fight.

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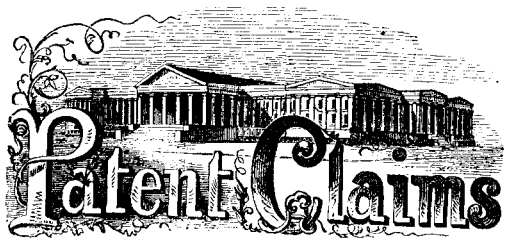

ISSUED FROM THE UNITED STATES PATENT OFFICE

Reported Officially for the Scientific American.

PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof-reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But, to enable the printer and proof-reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, for about *three weeks* after the claims are published in the SCIENTIFIC AMERICAN.

This explanation is intended to answer scores of letters received from patentees at this office every week, inquiring why they do not get their documents. We trust it will also save the Patent Office the trouble of writing to every patentee to explain the cause of their not receiving their patents the moment they see their claims published in these columns.

MUNN & Co.

FOR THE WEEK ENDING AUGUST 6, 1861.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,967.—Augustus Adams, of Sandwich, Ill.. for an Improvement in Corn Shellers:

I claim, first, The apron feeders, B B, construsted substantially as described, with the beveled partitions, C C, for the purpose of delivering the ears of corn longitudinally to the spouts.

Second, The auxiliary shaft, E, placed in the throat of the feed spouts, in the manner described and for the purpose specified.

Third, The construction of the wire cob rake or carrier, H, as described, that it may have no flat surfaces upon which the corn may be lodged.

1,968.—L. H. Brown, of Boston, Mass., for an Improvement in Keys for Pianofortes:

I claim the manner or process of straightening the porcelain, as set forth.

1,969.—N. H. Bruce, of Shirley, Mass., for an Improvement in Fruit Gatherers:

I claim the combination of the cylinder, B, provided with the prongs, C, staff or handle, A, and conductor, D, constructed and arranged as and for the purpose set forth.

1,970.—A. H. Camp, of Jackson, Mich., for an Improved Hot Air Furnace:

I claim the arrangement of the dampers, K L, rod, N, and vertical pipe, D, with the shell, A, and radiators, E F F′ H J J′ G, all in the manner shown and described.

[This invention consists in combining with a vertical direct draught pipe leading off from the rear part of a furnace, a series of horizontal radiating flues and an arrangement of dampers, by means of which latter a direct draught may be obtained in starting the fire, and when the fire is started, the smoke, hot air, &c., may be conducted through all the horizontal radiating flues before they are allowed to escape through the vertical flue.]

1,971.—J. W. Chappell, of Loomisville, Michigan, for an Improvement in Hand Corn Planters:

I claim the combination of the rods, d, box or hopper, A, provided with a bottom, a*, having inclined seed passages, e, and retaining bars, m, the slide, E, lever, F, and handle, D; all arranged for joint operation substantially as and for the purpose set forth.

[The object of this invention is to obtain a hand corn planter which will plant the kernals separately, that is to say, deposite the kernals in the hill at a proper distance apart, so that each will have a suitable place allotted to it for after growth and culture, and the kernals at the same time planted at a suitable and uniform depth in the ground.]

1,972.—Henry S. Chichester, of Brunswick, N. Y., for an Improvement in Plows:

I claim the combination and arrangement of the crossed bars, C and D, pivoted together at their crossing point, f, with the right and left plows, A and B, so as to constitute an implement for simultaneously hilling up both sides of a row of corn, as described, the same being capable of alteration into two separate single-mold-board plows, or a double-mold-board plow, or a plow for simultaneously turning two separate furrows outward, or a potato-digging plow as set forth.

1973.—James Clark, of Newark, N. J., for an Improvement in Retorts for the Manufacture of Prussiate of Potass:

I claim, first, A retort for making prussiate of potass of an egg or oval form, as described.

Second, The frame, C, door, D, baring, e, rod, f, spring, h, and plate, g, when constructed, combined and arranged in the manner and for the purpose set forth.

1,974.—Enoch Conger, of Milmore, Ohio, for an Improved Machine for Curvelinear Sawing:

I claim connecting the saw, R, to its straining rods, g g, by means of flexible cords, F F, as and for the purpose set forth.

[This invention relates to that class of sawing machines which are designed for sawing stuff in curved form. The object of the invention is to simplify and economize in the construction of this class of sawing machines, and at the same time render them efficient, more so, it is believed, than any of those heretofore arranged.]

1,975.—Charles W. Cooper, of Brooklyn, N. Y., for an Improvement in the Manufacture of Glue:

I claim the application to glue stock for the purpose of neutralizing the lime, or other alkali contained therein, of artificially prepared carbonic acid gas, in the manner set forth.

1,976.—Samuel D. Cooper, of Hartford, Conn., for an Improved Fire Alarm Apparatus:

I claim, first, The combination with an alarm device of a series of knives, N N, or other equivalent liberating contrivances, so communicating with the several apartments or appurtenances of the building or vessel, and so arranged in connection with a tablet or dial that, on the liberation of the alarm device by the operation of any one of the liberating contrivances, produced by the occurrence of fire in its respective apartment, or part of the premises or vessel, the said liberating contrivance will assume such a position on the tablet or dial that it may be seen which one has operated, and the spot where the fire has occurred may be made known, substantially as described.

Second, The combination of the weighted locking and unlocking lever, K, of the alarm device, the cord, f, for keeping the said lever in position to lock the alarm device, and the knives, N N; the whole arranged and operating substantially as and for the purpose specified.

1,977.—Isaac C. Crane, of Bronson, Michigan, for an Improvement in Spading Machines:

I claim the combination of rotary cylinders, A, segemental cam, K, pivoted spades, I, and springs, J, all constructed, arranged and operating in the manner and for the purposes explained.

1,978.—Philip and Henry E. Crapo, of Bridgewater, Mass., for an Improvement in Hoes:

We claim a new article of manufacture consisting of a hoe formed with teeth occupying less than one half its width, beveled at back, and tapering gradually downward in width to narrow edges.

1,979.—J. A. Dahlgren, of Philadelphia, Pa., for an Improvement in Cast-Iron Ordnance:

I claim a cast-iron gun constructed substantially according to the rule described, whereby the quantities of metal disposed in the different parts of the gun are proportionate, or nearly so, to the relative degree of strain exerted by the force of the exploded charge at those parts respectively.

1,980.—J. A. Dahlgren, of Philadelphia, Pa., for an Improvement in Cast-Iron Ordnance:

I claim the method described of manufacturing cast-iron ordnance, by first casting it in the rough of such proportions as will give the metal the most tenacity and freedom from contractile strains, and then reducing the casting to such proportions as will produce the form of gun best calculated to endure the shocks of discharge.

I also claim the manufacture of cast-iron ordnance substantially as described, with the rear portion thereof of a substantially spheroidal form and the exterior surface smooth and free from the moldings and other ornamentation with which guns have heretofore been made.

1,981.—J. A. Dahlgren, of Philadelphia, Pa., for an Improvement in Cast-Iron Ordnance:

I claim a gun having a body cast without trunnions or cascabel, so as to obtain the condition of metal most favorable to strength, the trunnions, and other accessories required for operating the gun, being secured to its surface by means of a trunnion strap and band, or the equivalent thereof, substautially as described.

1,982.—J. A. Dahlgren, of Philadelphia, Pa., for an Improvement in Projectiles for Rifled Ordnance:

I claim the elongated projectile described, with a hard metal body united to a soft metal bottom, substantially as described.

1,983.—Elisha Dexter, of Holme's Hole, Mass., for an Improved Refrigerator:

I claim my improved refrigerator, having its several parts constructed and arranged in relation to each other, and so as to operate together substantially in manner as set forth.

1,984.—Jacob Dichl and Wm. Wilson, of Brooklyn, Ohio, for an Improvement in Cider Mills:

I claim the special arrangement of the radial revolving cutters, P H, in connection with the stationary cutters, o, in combination with the fluted rollers, L S T I, as set forth and described for the purpose specified.

1,985.—J. E. Draper, of Northville, Mich., for an Improved Tool for Clinching Horse-Shoe Nails:

I claim a horse-shoe nail clinching tool composed of a serrated, segment-shaped jaw, D, and and a hook-shaped jaw, E, attached, respectively, to pivoted jaws, A B, and otherwise made as shown and described.

1,986.—John Ellis, of Detroit, Mich., for an Improved Gate Latch:

I claim the tumbler, c, in combination with the latch and catch, when operating conjointly, substantially as set forth for purpose described.

1,987.—J. K. Fisher, of New York City, for an Improvement in Locomotives and Steam Carriages for Common Roads:

First, I claim the combination of the intermediate shaft, C, and driving axle, D, with their cranks, E E, or crank-pins in the wheels, and the radius rod, A, and parallel rod, B, for the purpose of connecting engines to the driving wheels of a locomotive or steam carriage.

Second, I claim the combination of the projecting springs, F, and vertical shaft, G, and the universal joint, H, for the purpose of connecting the steering axle to body of a locomotive or steam carriage.

Third, I claim the combination of the screw, I, nut-rod, J, screw-rod, K, spring, F, and crank or arm, L, and the vertical shaft, G, as described, for the purpose of steering a locomotive or steam carriage.

Fourth, I claim the lurch rod, M, and the lurch spring, N, operating as set forth, for the purpose of limiting and softening the lateral movements of the driving axle.

1,988.—M. L. Gorham, of Winnebago Station, Ill., for an Improvement in Seeding Machines:

I claim, first, In combination with the wheels, E, and troughs, g, arranged as shown, the inclined surfaces or planes, c, placed at the bottom of the hopper, A, and in such relation with the partitions, a*, thereof to operate as and for the purpose set forth.

Second, The spouts, H′, provided with the partitions, I′, and scattering bars, J′, in combination with the seed distributing wheels, E, partitions, a*, and troughs, g′, all arranged as and for the purpose set forth.

Third, In combination with the seed distributing wheels, E, partitions, a*, and troughs, g, the spouts, K, provided with the central discharge passage, b*, side passages, d* d*, and adjustable sides, c*, as and for the purpose set forth.

[This invention relates to an improved seeding machine of that class designed for sowing seed broadcast or in close drills, and consists in an improved means for discharging or distributing the seed.]

1,989.—J. A. Heald, of Springfield, Mass., for an Improvement in Machines for Making Cigars:

I claim, first, Running a belt in the form of a loop, where by a single belt encloses and forms a bearing for the whole outside surface of the cigar with the exception of a sufficient space to admit the wrapper, the whole being constructed and operated in the manner and for the purpose set forth.

Second. The use of a belt of unequal thickness, for the purpose of giving to the cigar any required degree of taper, or for giving it any other desirable form, the outline of the cross section of the belt corresponding with the outline of the longitudinal section of the cigar.

Third, The use of the rotary brush, L, for facilitating the insertion of the wrapper, and to insure the winding of the same around the filling.

Fourth, The use of a series of rotary cutters with either smooth or toothed edges for cutting and shaping the ends of cigars when constructed in the manner and for the purpose set forth.

1,990.—Warren Hill, of East Smithfield, Pa., for an Improvement in Wash Boards:

I claim a washboard constructed of a rigid metallic plate, A, journaled on its face with hemispherical knuckles or projections, a, and at its edges with lugs, b, the said plate constituting both the face and back of the board, and serving also to hold the sides of the frame together, all as shown and explained and for the purpose set forth.

[This invention consists in the employment of a metallic plate provided with hemispherical projections or knuckles and secured in a wooden frame, the upper end of which forms a receptacle for the soap while its lower end is furnished with legs that rest on the bottom of the wash tub similar to an ordinary washboard, the whole being so ranged that the wooden frame is secured together by the metallic plate and that a washboard is produced capable to withstand the injurious influence of the water.]

1,991.—James Hoover, of Lewisburg, Ohio, for an Improved Automatic Boiler Feeder:

I claim the employment, in connection with a boiler, reservoir and feeding vessel, constructed substantially as shown, of the oscillating hollow rocker, L, and self-adjusting weight, O, in combination with the float, N, lever, K, and valves, 3 4, all in the manner and for the purpose shown and described.

1,992.—A. Houpt and J. K. Griffith, of Reading, Pa., for an Improved Measuring Faucet:

We claim the application of the circular cut-off valve, V, recessed in the bottom of piston for the purpose described.

1,993.—Thomas Hutchinson, of Green Point, N. Y., for an Improvement in Excavators:

I claim the combination of the plow, K, with the scoop, V, and the mechanism, as described, by which the plow, K, is elevated or lowered.

I claim, also, the scoop, V, in combination with the plow, K, and the mechanism, as described, by which the movements of the scoop are regulated and controlled.

1,994.—Cornelius Jacobs, of Columbus, Ohio, for an Improvement in Pans for Evaporating and Clarifying Saccharine Juices:

I claim, first, The specified arrangement of the division strips, a a, for the purpose set forth.

Second, The specified construction of the lower edge of the strips, a a, for the purpose set forth.

Third, The specified combination and arrangement of the adjustable bent pipe, l, and shallow evaporating pan with division strips, a a, which are tapered at their lower edge, all in the manner and for the purpose described.

1,995.—Louis F. A. Legouge, of Grass Valley, Cal., for an Improvement in Quartz Crusher:

I claim, first, The arrangement of a reciprocating cradle, A, in combination with a series of stampers, B, constructed and operating substantially in the manner and for the purpose described.

Second, The arrangement of the pins or stops, c, and cross bar, b, in combination with the stampers, B, and cradle, A, as and for the purpose set forth.

1,996.—Benjamin Levalley, of Hartford, and S. B. Levalley, of Manchester, Conn., for an Improvement in Temples:

We claim a pair of stationary jaws, one or both being grooved or serrated, substantially as described for the purpose specified.

1,997.—Thales Lindsley, of Moline, Ill., for an Improved Oar:

I claim, first, The hinge represented in Figs. 1 and 2, when constructed and operating substantially as described.

Second, The frame, f f f, supporting the carriage way, g g g, and preserving the two divisions of the loom in the same plane, as specified.

Third, The loom as divided into two general levers, with independent fulcra and as acting upon each other through the instrumentality of the segments attached, as and for the purpose set forth.

Fourth, The third class of feathering apparatus, as described and represented.

Fifth, Dividing the carriage way into two parts, which are united by interlapping or scarfing, for the purpose set forth.

Sixth, The hinge, the frame, and the divided loom, in combination with the third class of feathering apparatus and its divided carriage way, all as and for the purposes specified.

1,998.—W. D. Ludlow, of New York City, for an Improvement in Stoppering Jars, &c.:

I claim a can top that is composed of a central crossbar, an elastic bearer, and curved inclined arms, A, the whole combined as shown and described.

[This device is simple, durable, and not injurious to the jar or to the cover, and the metal used for fastening down the cover is prevented coming in contact with the contents of the jar.]

1,999.—M. W. Mason, of Elbridge, N. Y., for an Improvement in Ox Yokes:

I claim the strap, C, when formed of two parts, c d, connected together substantially as shown, and the lower part, d, provided with a ledge, i, which is fitted in a groove, j, in the under side of the yoke, and secured thereon by a key or keys, k, substantially as and for the purpose specified.

2,000.—Bently Masslich, of Union City, Ind., for an Apparatus for Papering Walls:

I claim the paste box, A, provided with the rollers, C D, and paper roll, F, when arranged substantially as and for the purpose set forth.

I further claim, in combination with the paste box, A, rollers, C D, and paper roll, F, the smoother, H, constructed substantially as and for the purpose specified.

[The object of this invention is to obtain a device for facilitating the applying of wall paper on walls, and consists in the employment or use of a portable paste box provided with rollers and used in connection with a smoother.]

2,001.—F. F. Mayer, of New York city, for an Improvement in Bleaching Fatty Substances:

I claim the employment of brown oxyd of lead, either pure or in combination with other substances, substantially in the manner specified for the purposes set forth.

2,002.—W. H. Perry, of St. Louis, Mo., for an Improvement in the Manufacture of Iron:

I claim preparing the iron for the puddling furnace, by passing it through the machine described, soon after it has come from the blast furnace; before it has had time to cool and while it is yet red hot, so as to reduce it to a crumbled mass.

2,003.—Joseph Rider, of Newark, Ohio, for an Improvement in Water Elevators:

I claim the use of the hinged partition, p, in connection with the buckets, m m, the notched swinging doors, l l, the curved valve rods, r r, and the valves, s s, substantially in the manner and for the purpose set forth.

2,004.—Albert Russell, of Newburyport, Mass., for an Improvement in Pumps:

I claim my improved pump, as constructed with the auxiliary induction pipe, F, and the air chamber or vessel, G, arranged relatively to each other, to the lower box or valve, and to the main induction pipe, E, as specified.

2,005.—J. J. Shafer (assignor to R. J. Robeson), of Burlington, Iowa, for an Improvement in Grain Winnowers:

I claim, first, The screens, a, and return boards, b, in combination with the direct fan blast through the screens, when arranged as and for the purposes set forth.

Second, The combination of the short uniform shake with the mode of applying the currents of air to the grain, substantially as described.

2,006.—S. M. Sherman, of Fort Dodge, Iowa, for an Improved Broom:

I claim a broom provided with an upper riveted band, B, having socket protuberances, b, to receive and hold the handle, and a lower riveted band, C, attached both to the body of the broom and to the handle, all as shown and described.

2,007.—John Sweeney, of Chicago, Ill., for an Auxiliary Apparatus for Increasing the Draft of the Furnaces of Locomotive Engines:

I claim the arrangement of a blow-cock or valve, as described, upon

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the front or dome of a boiler, and with a pipe leading to the chimney in the manner and for the purpose specified.

2,008.—John Thompson, of Clifton, N. Y., for an Improved Machine for Boring Wagon Hubs:

I claim, first, The combination of the boring arbor, C, and its mortise with the vibrating cutter bar, B, working in the arbor, as described.

Second, The revolving disk with its center, opening and slot connected, also its combination with the dog rod and dogs.

2009.—Alonzo Webster, of White River Junction, Vt., for an Improvement in Seed Sowing Machines:

I claim the horizontal and stationary knives, J K, applied respectively to the hopper, I, and frame, A, and in relation with the openings, f, and slots, g, of the slide, H, to operate as and for the purpose set forth.

[This invention relates to a new and improved machine for cutting and planting potatoes, also for planting seeds of various kinds and sowing pulverulent manures. The object of the invention is to obtain a machine which will be simple in construction and capable of general adaptation, and one that will operate with certainty in all cases.]

2,010.—Edward Weissenborn, of New York City, for Method of Making Iron Chains:

I claim the method of making chain links, as described, which consists of winding the iron into a circle or ring of the form shown at Fig. 2, then welding it throughout its entire circumference into one solid piece before it is linked into chain and rolling it out so that its section will be circular and so made smooth and fit to be used for chain.

2,011.—Adam Brightbill (assignor to himself and John Brightbill), of Bethel Township, Pa., for an Improvement in Corn Planters:

I claim, first, The independent plow frame. P, wheels, R, plows, S, bar, T, pins, U U, combined and arranged for the purpose, as more fully described and specified.

Second, I also claim the combination of the gear wheel, G, shaft, H, shifting bar, M, lugs, K, and L, for the purpose of throwing the planting apparatus into and out of gear, as described and specified.

Third, I also claim the frame, A, when used in combination with the independent plow frame, P, as more fully described and specified.

2,012.—H. A. Frost (assignor to H. S. & D. H. Whittemore), of Worcester, Mass., for an Improved Apple Parer:

I claim, first, In combination, the table, E, with paring knife attached, the pin, N, and gear, G, or their equivalents, for the purpose of moving the paring knife around the apple and causing it to return, substantially as described.

Second, I claim the cam or its equivalent, upon the gear, G, for the purpose of forcing the knife back from the apple on its return motion after having pared it.

2,013.—Constantin Hingher, of New Brunswick, N. J., assignor to the Novelty Rubber Company, for an Improvement in Stems for Smoking Pipes:

I claim the stem of a smoking pipe having a condensing chamber to be used without the insertion of any substance therein, and so constructed that the oil or moisture which is therein condensed is prevented from running back into the pipe, substantially in the manner and for the purpose set forth.

2,014.—J. L. Krauser (assignor to himself, James Harper and J. H. Brown), of Philadelphia, Pa., for an Improved Nail Machine:

I claim, first, In combination with a movable cutter, a horizontal table that is vibrated past its central line at the rear only, and not at its front, and that is capable of holding a pile of nail plates from which the under one of the pile can be taken and fed up, and which is at rest whilst the cutter is acting, substantially as described.

Second, I also claim supporting the rear ends of the pile of plates upon an arm or tongue, for the purpose of allowing the plate carrier to move under them, and take and carry forward the lower plate of the pile, substantially as described.

Third, I also claim the nail plate carrier, L, having a longitudinal and a cross groove in it, for the purpose of allowing it and the arm that operates it to move past and under the tongue that holds up the nail plates, substantially as described.

Fourth, I also claim the lip or ledge, n, on the nail plate carrier, for the purpose of preventing the rear end of the nail plate from tipping under the action of the cutter, substantially as described.

Fifth, I also claim, in combination with a vibrating table, the bridge and brace for holding the nail plate and table down against the rising action of the cutter, substantially as described.

Sixth, I also claim, in combinatien with a vibrating table, the lateral adjustment thereof, by means of the set screws, 17, at its front end for regulating the forming of the heads on each side of the griping jaws, substantially as described.

Seventh, I also claim, in combination with a vibrating table, the regulating of the taper of the nails by increasing or diminishing the throw of the rear end of the said table, substantially as described.

Eighth, I also claim a slot in the side of the table for allowing the spring lever, M, to form a working connection with the plunger or nail plate carrier, substantially as described.

Ninth, I also claim, in combination with the table, plunger and spring lever, the pivoted switch to allow the lever to pass, but prevent the nail plates from entering the slot, substantially as described.

Tenth, I also claim, in combination with the bed griper, w, the nipper rod, y, placed in a groove in said bed griper, substantially as and for the purpose described.

Eleventh, I also claim a yielding and adjustable turning rod, constructed and operating substantially as described.

Twelfth, I also claim the attaching of the turning rod to the griping lever, so that it shall receive its motion from said griping lever, with which it acts in concert, substantially as described.

Thirteenth, I also claim the employment of two headers upon one rocking shaft, substantially as described.

Fourteenth, I also claim the combination, in a right and left heading nail machine, of a double cutting cam and a double griping cam on a revolving shaft, and a double heading tool on a rocking shaft, substantially as described.

2,015.—E. R. Morrison, of South Bergen, N. J., assignor to the Hanlon Brothers, of New York City, for an Improved Locomotive Apparatus:

I claim, first, The combination with a box or frame containing a spring or other motor, of one or more pairs of legs and feet which support the said box or frame on opposite sides thereof, and which are so actuated by the mechanism within the box that the legs on opposite sides have an alternating step by step movement, substantially as described.

Second, The construction of the legs of parallel bars connected by pin joints with the feet, and with upright slides, C C, either with or without joints, g g, substantially as described, for the purpose of causing the feet to be placed flat on the floor at every step.

Third, The eccentrics, I I', applied in combination with the legs, to produce combined upward and downward and forward movements, substantially as described.

Fourth, The extension of each foot in a lateral direction beyond the center of gravity of the apparatus, substantially as and for the purpose specified.

Fifth, The combination of the knee joints, g g, the rods, r r, or their equivalents, the wipers, p p, and the springs, j j, the whole operating substantially as specified.

2,016.—William Quann (assignor through mesne assignments to himself, Wm. N. Taylor and Lathrop & Wetmore), of Philadelphia, Pa., for an Improved Process for the Reduction of Iron Ore:

I claim an improved process for the reduction of iron from the ore, consisting in the use of solutions of wood ashes, pulverized charcoal, carbonate of ammonia, a fixed oil and common salt, mixed in the proportions and used in the manner substantiolly as described.

2,017.—Welcome Sprague, of Farnham, N. Y., assignor to himself, D. E. Barker and Wm. Van Duzer, of Angola, N. Y., for an Improvement in Reaping Machines:

I claim the combination and arrangement of the self-acting rake, T, for moving the cut grain from the platform, a binder's stand and table, R, and an endless apron, P, for carrying the grain to the binder, so that the grain may be bound by hand upon the machine, substantially as set forth.

2,018.—E. M. Stevens, of Medford, Mass., assignor to Wm. N. Ely, of Stratford, Conn., for an Improved Hand Pegging Machine:

I claim, first, Making the awl and peg-driver in two pieces, and so uniting them to a plunger as that, whilst both rise and descend together, one of them shall have a lateral motion independent of the other, for the purpose of feeding the machine to the work, substantially as described.

Second, The device, I, or its equivalent, in combination with the plunger and rod, H, for feeding the pegs forward as they are driven.

2,019.—J. C. Stoddard (assignor to himself and W. A. Hacker), of Worcester, Mass., for an Improvement in Horse Rakes:

I claim, first, Combining with the driving gear, E, on the carriage wheel, B, the pinion spur wheel, F, keyed to a rockshaft, G, having one of its end bearings in the short arm of loaded lever, I, and operating as set forth.

Second, I claim, in combination with the pinion, F, and the loaded lever, I, having its bearing in standard, J, the cam plate, g, and catch projection, f, and the long teeth, e e, on spur wheel, F, all arranged and combined as set forth.

Third, I claim connecting the rake head, D, to the rockshaft, G, operated as set forth by an extension pitman rod, K, crank arm, d, and arm, L, substantially as set forth.

Fourth, I claim bracing or sustaining a spring tooth rake by means of a back brace, constructed and applied to the rake substantially as set forth.

[This invention relates to certain improvements in horse hay raking machines wherein a sweeping rake is used, the object of which improvements being to transfer to the horse drawing the machine the labor of holding the rake down while gathering its burden of grass, and tilting it up to leave the same, and at the same time, to give the driver complete control over the rake, either in the forward or backward movements of the machine. It also has for its object a method of holding the rake teeth down, and bracing them up to the work of raking the hay into cocks when the machine is used for this purpose.]

2,020.—G. E. Burt, of Harvard, Mass., for an Improvement in Endless Chains and Tread of Horse-powers:

I claim, first, A stud or projection attached to one end of a link which shall act as a brake on the wheel of the adjacent link, substantially as and for the purposes specified.

Second, Connecting the links of endless chain horse-powers by pivots working in elliptical holes, c, as explained, so as to permit vertical but prevent endwise play.

Third, Combining the treads with recessed links and safety bars, all held firmly together by end bolts, substantially as and for the purpose specified.

RE-ISSUES.

112.—Hiram Tucker, of Newton, Mass., for an Improvement in Spring Bed Bottoms. Patented July 3, 1855; additional improvement June 9, 1857; re-issued April 5, 1859:

I claim a spring bed bottom constructed and operating substantially as described.

113.—Richard Vose, of New York City, for an Improved Car Spring. Patented June 5, 1860:

I claim giving such a shape to the metallic sections which are interposed between the elastic sections of my improved car spring as will produce any desired number of air cavities or spaces between the bearing surfaces of said sections, substantially as set forth.

I also claim giving such a shape respectively to the elastic and the inelastic sections of my improved car spring as will allow the former, while under pressure, to yield freely at their outer and inner peripheries, whilst the sides of the said elastic sections are allowed to yield into air cavities between the bearing surfaces of the unelastic sections of said spring, substantially as set forth.

EXTENSIONS.

5,236.—T. J. Rodman, of Pittsburgh, Pa., for an Improvement in Casting Ordnance, &c. Patented August 14, 1847:

I claim the cooling from the interior of guns or other heavy hollow castings intended to resist a central force, by circulating within the core a cooling fluid or gas, in combination with the application of artificial heat at the exterior of the flask to prevent cooling from without.

5,237.—Wm. J. Pulver, of Troy, N. Y., for an Improvement in Fire Grates. Patented August 7, 1847:

I claim the manner of dividing the grate into compartments by means of serrated or interlacing bars or teeth, having an oscillatory or semi-revolving motion with the transverse bars of which they form a part or to which they are united, and this in combination with the rockshaft through which the said motion is propagated from the lever.

RECENT AMERICAN INVENTIONS.

Fire Alarm.—The object of this invention is to give an instantaneous alarm in case of fire occurring in any part of a building or its appurtenances, or of a steamboat or other vessel, and to show at once in what apartment or place the fire has originated, thereby enabling the efforts to extinguish it to be at once directed to the right spot, and obviating all loss of time in seeking for its location. The apparatus, though giving a prolonged alarm, partakes somewhat of the general character of what is known as an "annunciator," used in hotels and steamboats; that is to say, it is composed of a single alarm device, which may be placed in any conspicuous place, and a series of separate liberating contrivances, so applied in combination with said alarm device, and with cords, threads, or filaments of combustible material in the several apartments or appurtenances of the building or vessel, and in relation to a suitable board, tablet or dial, that on the occurrence of fire in any part of the building, premises or vessel, the liberating contrivance belonging to that part will liberate the alarm device and cause the sounding of the alarm, and assume such a position relatively to the said board, tablet or dial, that it may be seen which one has operated, and so enable the exact spot where the fire has occurred to be made known. Samuel D. Cooper, of Hartford, Conn., is the inventor of this ingenious device.

"*Walker.*"—This invention is more especially intended to be applied to dolls and other toys, but may be applied to other uses. It consists in a frame or box supported upon legs and feet, which, by the action of a spring or other motive agent within the said frame or box, are caused to have an alternating step by step movement resembling that of walking. It also consists in certain means by which the motor within the box is made to actuate the legs; also, in a certain construction of such legs and feet, each leg of parallel bars, with the foot so applied, that the foot may be placed flat on the floor or other surface upon which the walking is performed at every step, and so insure steadiness of movement; also, in a certain arrangement of the feet, whereby the apparatus is balanced and firmly supported on each leg and foot while the step is being taken by the opposite leg and foot; and further, in a certain construction of the legs, and means of operating the same, whereby the movement of the knee-joint is imitated. This device was invented by E. R. Morrison, of South Bergen, N. J.

Automatic Boiler Feeder.—This invention relates to that description of automatic boiler feeder which consists of a vessel interposed between the boiler and reservoir and furnished with a system of valves which are in part so actuated by a float within the said vessel to the reservoir and to the atmosphere, while its communication with the boiler is closed, and afterward to close it to the reservoir and to the atmosphere, while its communication with the boiler, both above and below the water line is opened, thereby causing the water to run first from the reservoir to the said vessel, and afterward from the said vessel to the boiler, by gravitation, such operation only taking place while the water in the boiler is below the desired level. The improvement consists in a novel system of devices through which the float is made to actuate the steam and air valves in a very certain manner. This invention was patented by James Hoover, of Lewisburg, Ohio.

Broom.—The object of this invention is to obtain a stronger and more durable mode of securing the broom-corn together in proper form, and also of securing the same to the handle. The great difficulty hitherto experienced in constructing durable brooms has been the binding of the corn. Wire and twine have been chiefly used for this purpose, and reliance has been chiefly placed on the secure attachment of the broom-corn to the handle in order to strengthen the broom, and in the event of the handle working loose in the broom-corn, a contingency of very frequent occurrence, the broom falls to pieces. To obviate this difficulty, the broom-corn is secured in proper form, and in a desirable compact state, perfectly irrespective of the handle, by means of sheet-metal bands and rivets, so arranged or applied that the bands will admit of the handle being firmly secured in the broom corn. The patentee of this invention is S. M. Sherman, of Fort Dodge, Iowa.

Nail-Clinching Device.—The object of this invention is to supersede the ordinary hammer and steel bar now used by the horse-shoers to clinch the driven nails on the hoof of the animal. The invention consists in having two handles connected by a fulcrum pin or joint, and provided respectively with a hooked and a corrugated segment jaw, whereby the desired work may be performed with far greater facility than usual, and in a superior manner, the nails not being liable to be started or forced back in clinching, as is the case in using the ordinary means for the purpose. The inventor of this apparatus is J. E. Draper, of Natteville, Mich.

Fruit Gatherer.—The object of this invention is to obtain a simple, cheap, and efficient device by which apples and similar fruit may, without a ladder, be plucked from the tree and deposited in a basket or other suitable receptacle, without being bruised or injured in any way. The invention consists in the employment or use of a series of wire prongs attached to a sheet-metal cylinder, which is secured to a proper handle or staff, and provided with a conductor to convey the plucked fruit to the operator. This apparatus was invented by Norman H. Bruce, of Shirley Village, Mass.

Ox Yoke.—The object of this invention is to obtain better curves for the yoke than has been hitherto used, so that the yoke may fit the animals perfectly, and also to provide a means for regulating the draft attachment, so that either animal may be favored in draft, if occasion requires. Ox yokes of ordinary construction have not sufficient curve over the necks of the animals. The reason of this is, that the wood will not admit of it, the yoke being liable to split at the curvature during the direction of the grain of the wood. This difficulty is fully obviated by this invention. This device was invented by M. W. Mason, of Elbridge, N. Y.

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Notes and Queries

J. R. K., of Penn.—You will find a minute description of the mode of casting steel bells on page 102, Vol. 2, New Series, SCIENTIFIC AMERICAN.

G. O. B., of Mass.—Your suggestion for broad drums in place of wheels for our gun carriages and baggage wagons is noticed. We think, however, that wheels would be preferable even on our Southern roads.

C. P., of N. Y.—In order to expel the air from your barometer as you fill it, introduce the mercury in small successive portions and boil each portion after it is poured in over a charcoal fire.

A. J. G., of Mass.—The law does not require the name of the patentee to be stamped upon the manufactured article. The date only is required.

H. N. S., of Mich.—We have seen several bullets intended for smooth-bored guns, so constructed as to receive a spinning motion by the force of the powder, but they were all defective.

N. R., of N. H.—There is no encouragement for you to come to this city hoping to find a situation as a draftsman. There are too many here now anxiously waiting for something to turn up.

C. N. S., of Ind.—We feel much obliged to you for your encouraging letter. Your views of our national affairs are impartial and sound. The government and not party is to be sustained.

V. C., of Md.—It is not new to propel a vessel by means of a screw propeller acting on the air. We do not undertake to say what may not be accomplished in the way of aerial navigation, but we do know that up to this time aerial navigation has not succeeded with all the countless experiments that have been made. The mere fact of balloon reconnoissances, such as have been made by the government are nothing like practical tests of actual navigation. These balloons are controlled by ropes fixed to the earth at the point of starting.

R. H., of R. I.—Machines have recently been patented which will knit a stocking complete with a properly shaped heel and calf and without any seam, by a continuous operation. You can obtain particulars from the McNary Knitting Machine Co., 25 William street, New York city.

J. K. M., of Conn.—So far as we know, lime is the best substance which you can employ to remove the grease from your penguin skins preparatory to tanning. Make up a tub or vat containing strong milk-of-lime (lime made up with water to the consistence of cream, and steep the skins in this for several days. Potash lye is liable to injure the texture of skin in combining with the grease; it should not be used for the purpose.]

W. R. B., of Wis.—We have had a vast pile of letters suggesting various modifications of rifles and bullets, which we could not publish because the opinions contained in them were not supported with experimental data. The Jacob and Whitworth rifles have a rapid twist, the bullet making one revolution in from twenty to twenty-four inches.

A. E. W., of New York.—It is best to have strings of different sizes on an Eolian harp. The amount of recoil in a gun depends upon the weight of the ball and the amount of force required to start it. We prefer to have the touch-hole enter the barrel of a rifle at the back end of the breech, but it will answer about as well situated on the side in the usual way.

G. H. S., of Ohio.—Balloons, as agents of warfare for carrying missiles up and discharging them down upon the top of an army or inside a fort, have been frequently suggested, but they are such an undisciplined set of creatures that they cannot be trusted in carrying out orders. If you can discover some method of putting them under perfect drill, you will accomplish a feat deemed impossible by the most sage strategists.

J. B., of Mich.—Your theory respecting cotton growing and slavery is one that we do not desire to discuss. We have thus far tried to uphold the government by showing the injurious effects of secession when fully carried out. We have no intention or desire to promulgate theories designed to overthrow the industrial interests of the South, as we hope to see them return to the Union loyal citizens, and then to see them prosper together with us as a great nation. We do not espouse any pet political schemes.

W. Q., of Pa.—We cannot consent under any circumstances to suppress any patent claims. To do so would render our official list unreliable.

Gulielmus, of Ill.—For best variety of strawberry see page 7 of the current volume.

J. P., of Ind.—For answers to your large number of questions about rifles, we must refer you to the back numbers of the last and current volumes of the SCIENTIFIC AMERICAN.

F. W. E., of N. Y.—Depositing ashes in the cellar, we should think, could certainly have no *bad* effect on the health of a household. The bits of charcoal among the ashes would absorb deleterious gases, and in this respect would be beneficial.

E. M. F., of Pa.—A person on presenting an application for a patent is obliged to make oath that he believes himself to be the original and first inventor of the improvement. He cannot, by power of attorney, convey the right of application to another party, but by proper assignment the inventor can have the patent issued to the assignee. If an unpatented invention is left by a deceased inventor, Letters Patent can be secured by his administrator for the benefit of his heirs.

P. W. & Co., of Ohio.—The patent of Thomas Blanchard for lathe for turning irregular forms expires Jan. 20, 1862.

A. DeQ., of N. Y.—The old mode of case-hardening is to place the iron articles in a close iron box filled with leather, pieces of horn and hoofs subjecting them to a red heat for about four hours, when the box is taken out and plunged into oil or cold water. Case-hardening is executed more expeditiously with the use of the prussiate of potash as a substitute for the hoofs, &c., but we think the old mode produces the best finished articles.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Aug. 14, 1861:—

N. H. B., of Mass., $25; M. M., of Mass., $25; C. S. G., of N. Y., $15; T. G. B., of Mass., $25; W. McI., of Ill., $20; W. H. M., of R. I., $25; J. P. R., of Iowa, $15; J. V. H., of Ill., $15; C. V. H., of Mass, $15; J. H. S., of N. J., $40; W. W., of Wis., $25; C. T. L., of Pa., $25; H. B. and J., of Iowa, $25; A. B. P., of N. T., $5; H. and J., Conn., $100; T. A. M., of Wis., $25; G. A. H., of N. Y., $15; W. M., of Ohio, $15; S. H., of N. Y., $40; M. L. B., of N. Y., $15; M. O. B., of N. J., $15; C. and M., of N. Y., $15; J. C. B., of Wis., $15; H. T. P., of Conn., $25; J. G., of Conn., $15; A. B., of ——, $15; S and B., of Wis., $25; J. M. L., of N. Y., $20; J. M., of N. Y., $20; J. P. D., of N. Y., $12; S. R., of N. Y., $25; F. and B., of Wis., $25; J. H., of Pa., $20; J. B., of Ohio, $20; M. and O., of Ill., $20; E. B., of N. Y., $20; A. M., of Maine, $15; G. H., Jr., of Conn., $20; M. D. W., Ind., $20; L. S. S., of N. Y., $20; W. and McN., of Pa., $20; R. K., of Mass., $40; B. and C., of N. Y., $20; A. H. H., of Mass., $20; S. H. H., of Ill., $20; L. K. of N. Y., $20; W. F. B., of Ill., $20; C. M. P., of Mass., $20; C. C. P. W., of Mass., $20.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Aug. 7 to Wednesday, Aug. 14, 1861:—

H. B. and J., of Iowa; A. B. P., of Cal.; J. W. F., of Ill.; C. F. L., of Pa.; W. W., of Wis.; S. R., of N. Y.; W. H. M., of R. I.; W. McI., Ill.; J. R., of N. Y.; T. G. B., of Mass.; J. C. G., of Mass.; J. P., of N. Y.; J. M., of N. Y.; S. and B., of Wis.; J. M. L., of N. Y.; S. C., Jr., of Maine; T. A. M., of Wis.; E. E., of Maine; R. A., of Pa.; C. C. C., of N. Y.

INSTRUCTIONS ABOUT EUROPEAN PATENTS, With a Synopsis of the Patent Laws of the Various Countries.

AMERICAN INVENTORS SHOULD BEAR IN MIND that, as a general rule, any invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Four patents—American, English, French and Belgian—will secure an inventor exclusive monopoly to his discovery among 100,000,000 of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the Scientific American Patent Agency. We have established agencies at all the principal European seats of government, and obtain patents in Great Britain, France, Belgium, Prussia, Austria, Spain, &c., with promptness and dispatch.

It is generally much better to apply for foreign patents simultaneously with the application here; or, if this cannot be conveniently done, as little time as possible should be lost after the patent is issued, as the laws in some foreign countries allow patents to any one who first makes the application, and in this way many inventors are deprived of valid patents for their own inventions.

Many valuable inventions are yearly introduced into Europe from the United State, by parties ever on the alert to pick up whatever they can lay their hands upon which may seem useful.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of each case.

GREAT BRITAIN.

Patents for inventions under the new law, as amended by the act of Oct. 1, 1852, and now in operation, include the United Kingdom of Great Britain and Ireland in one grant, which confers the exclusive right to make, use, exercise or vend. This is conceded to the inventor, or the introducer, for a period of fourteen years, subject, after the patent is granted, and the first expenses paid, to a government tax twice during its existence—once within three years, and once again within seven. The purchaser of a patent would assume the payment of these taxes.

There is no provision in the English law requiring that a patented invention shall be introduced into public use within any specified limit. Under the Patent Act of October, 1852, the British government relinquished its right to grant patents for any of its colonies, each colony being permitted to regulate its own patent system. If a patent has been previously taken out in a foreign country, the British patent will expire with it.

FRANCE.

Patents in France are granted for a term of fifteen years, unless the invention has been previously secured by patent in some other country; in such case, it must take date with and expire with the previous patent. After the patent is issued, the French government requires the payment of a small tax each year so long as the patent is kept alive, and two years' time is given to put the invention patented into practice.

It should be borne in mind that, although the French law does not require that the applicant should make oath to his papers, yet if a patent should be obtained by any other person than the inventor, upon proof being adduced to this effect before the proper tribunal, the patent would be declared illegal.

BELGIUM.

Patents in Belgium are granted for twenty years, or if previously patented in another country, they expire with the date thereof. The working of the invention must take place within one year from date of patent; but an extension for an additional year may be obtained on application to the proper authorities. Inventors are only legally entitled to take out patents.

THE NETHERLANDS.

Patents are granted by the Royal Institute of the Netherlands to natives or foreigners represented by a resident subject, which extend to a period of about two years, within which time the invention must be brought into use, and upon payment of an additional tax, a patent will be granted to complete its whole term of fifteen years. Unless these conditions are complied with, the patent ceases.

PRUSSIA.

Applications for patents in Prussia are examined by the Royal Polytechnic Commission, and unless there is novelty in the invention, the applicant's petition will be denied; and if it is granted, the invention must be worked within six months afterward. A respite, however, of six additional months may be obtained, if good and sufficient reasons for it can be shown.

AUSTRIA.

Austrian patents are granted for a term of fifteen years, upon the payment of 1,000 florins, or about $500 in American currency. This sum, however, is not all required to be paid in advance. It is usual to pay the tax for the first five years upon the deposit of the papers, and the patent must be worked within its first year. The Emperor can extend the patent and privilege of working by special grant. In order to obtain a patent in Austria, an authenticated copy of the original Letters Patent must be produced.

SPAIN.

The duration of a Spanish patent of importation is five years, and can be prolonged to ten years; and the invention is to be worked within one year and one day.

To obtain a Cuban patent requires a special application and an extra charge.

RUSSIA.

Since the close of the Crimean war, considerable attention has been given to Russian patents by Americans. Russia is a country rich in mineral and agricultural products, and there seems to be a field open for certain kinds of improvements. The present Emperor is very liberally disposed toward inventors, and as an evidence of the interest which he takes in the progress of mechanic arts, we may state that we have had visits from two distinguished Russian *savans*, specially sent out by the Emperor to examine American inventions. As Russian patents are expensive, and somewhat difficult to obtain, we do not take it upon ourselves to advise applications; inventors must judge for themselves; and this remark applies not only to Russia, but also to all other foreign countries.

CANADA.

Patents of invention are granted only to actual residents of Canada and British subjects. Under the general Patent Law of Canada, an American cannot procure a patent for his invention there. The only way in which he can do so is by virtue of a special act of Parliament, which is very difficult, uncertain, and expensive to obtain. Several zealous friends of reform in Canada are working earnestly to bring about a reciprocal law, but their efforts have thus far proved fruitless.

BRITISH INDIA.

The date of the law, Feb. 28, 856; duration of a patent, fourteen years. Invention must be worked within two years from date of petition. Privilege granted only to the original inventor or his authorized agent in India.

SAXONY.

Duration of patent, from five to ten years. Invention must be worked within one year from date of grant. Careful examination made before granting a patent.

HANOVER.

Duration of patent, ten years; and in case of foreign patent having been previously obtained, an authenticated copy of said patent must be produced. Invention must be worked within six months from date of grant.

SARDINIA.

Duration of patent, from one to fifteen years. Patents for five years or less must be worked within one year, and all others within two years.

NORWAY AND SWEDEN.

Duration of patent, three years, at least; fifteen at most, according to the nature and importance of the invention. Patents for foreign inventions not to exceed the term granted abroad, and to be worked within one, two or four years.

AUSTRALIA.

Date of law, March 31, 1854. Careful examination made by competent persons previous to issue of patent, which, when granted, extends to fourteen years. Imported inventions are valid according to duration of foreign patent. It would require from twelve to eighteen months to procure a patent from the Australian government.

Parties holding foreign patents secured through our agency will be notified from time to time of the condition of their cases.

GENERAL REMARKS.

While it is true of most of the European countries herein specified, that the system of examination is not so rigid as that practised in this country, yet it is vastly important that inventors should have their papers prepared only by the most competent solicitors, in order that they may stand the test of a searching legal examination; as it is a common practice when a patentee finds a purchaser for his invention for the latter to cause such examination to be made before he will accept the title.

It is also very unsafe to entrust a useful invention to any other than a solicitor of known integrity and ability. Inventors should beware of speculators, whether in the guise of patent agents or patent brokers, as they cannot ordinarily be trusted with valuable inventions.

Messrs. MUNN & CO. have been established *fifteen years* as American and Foreign Patent Attorneys and publishers of the SCIENTIFIC AMERICAN, and during this time they have been entrusted with some of the most important inventions of the age; and it is a matter of pardonable pride in them to state that not a single case can be adduced in which they have ever betrayed the important trust committed to their care. Their agents in London, Paris, and other Continental cities, are among the oldest and most reliable Patent Solicitors in Europe, and they will have no connection with any other.

CAUTION.—It has become a somewhat common practice for agents located in England to send out circulars soliciting the patronage of American inventors. We caution the latter against heeding such applications, or they may otherwise fall into the hands of irresponsible parties, and thus be defrauded of their rights. It is much safer for inventors to entrust their cases to the care of a competent, reliable agent at home.

FEES.—The fees required by us for the preparation of foreign applications are not the same in every case; as, in some instances, when the inventions are of a complicated character, we are obliged to charge a higher fee. Applicants can always depend, however, upon our best terms, and can learn all particulars upon application, either in person or by letter.

Parties desiring to procure patents in Europe can correspond with the undersigned, and obtain all the necessary advice and information respecting the expenses of obtaining foreign patents.

All letters should be addressed o Messrs. MUNN & CO., No. 37 Park-row, New York.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors

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and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering estimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient co ps of Draughtsmen and Specification Writers than are employed at p esent in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For rther particulars, address MUNN & CO., No.37 Park-row, New York .

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents orin the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No.37 Park-row, New York.

How to Make an Application for a Patent.

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Shield for Soldiers.

MESSRS. EDITORS :—To avert the fearful carnage attendant upon the assault of batteries such as are established by the Rebel forces near Manasses Junction, is the great aim of patriotic minds. Among the many anxious trials of bullet and bomb-proof defences, allow me to ask, if there has not been a great neglect of one method of security? While so many desperate experiments are being tried to find, in 4, 6 and 8-inch iron and steel shields, power of resistance to the tremendous force of rifled cannon, how few do we find that avail themselves of the simple means of deflection instead of direct action? A thin piece of gold, silver or brass, not a sixteenth of an inch in thickness, will turn aside the most powerful bullet of a rifle at ten paces, if lying at an angle of twenty-five or thirty degrees. How much simpler and how much easier to provide for our men and ships by mere contrivance of position-shields, that are proof by angle of incidence, rather than those enormous masses of iron which shall receive directly the impact of balls and shell? A plate of iron, well polished, less than three-fourths of an inch thick, placed at an angle of twenty-five degrees, will glance harmlessly aside the ball or shell of Whitney's, Armstrong's, Parrot's or any other gun, and with scarcely a perceptible token of its action. The more powerful and the more rapid the course of such projectile only the more sure its deflection.

On this principle it seems feasible and simple to protect the heads of charging columns from the deadly fire of those batteries (masked or otherwise) which so often annihilate them. I subjoin a rough draught of a shield which could be so constructed. I think the general plan is self-evidently practicable, and experience alone could suggest those alterations rendering it adapted to circumstances. The shield is to be made of wrought-iron a quarter to two-thirds of an inch in thickness. It should be perfectly smooth exteriorily; should be eight feet high; supported by a braced beam one hundred and twenty feet in length; the sides of the shield forty feet in length, and set at an angle of thirty degrees; the beam resting on two eight-feet wheels directly on the rear of the shield, supporting it two feet from the ground when level. Across the shield, within, five feet apart, are braces making firm against each other the two sides, and being levers against which each rank of men exercise their strength pushing it forward, and which become steps for mounting any earth work against which it may be run. Such a shield would protect from any direct fire the head of an assaulting column, and the column itself. Resting on the two immense wheels, it can be raised or lowered to adapt it to any irregularity of ground, by depressing the alternate ends, according to the hands bearing it along. Admitting (as such size would, in ranks of twenty abreast,) nearly 300 men to act upon its levers, its weight would be as a mere toy in their hands. Upon such shield, and the head and body of a column advancing under its shelter, at empest of balls, shell or musketry would rain innocuously. Rushing forward under shelter of this, the column might press to the very mouth of the opposing battery almost unharmed, and then dash up the steps afforded by the levers within, and pour down on their foes within the embrasure a resistless power. And it is evident any body of men seeking to stand before the attack of such column must perish. The mighty iron-shod front, pressed forward by that great column of men, would carry down horse and rider as straw; and against its advance bullets and blows would be alike powerless. The plan may seem chimerical, but I most firmly believe the principal must be the one upon which our ships and men are to be shielded. R. W.

[We agree with our correspondent that his scheme may be chimerical, but as the idea may suggest something practical we have his drawings engraved. The plan of placing shields obliquely to the direction of the shot has been very extensively discussed in England, and plans have been suggested for constructing ships with sloping sides to bear the shields.

The shield of our correspondent could only be used in roads, and if constructed 120 feet in length, only in pretty level roads. We suspect that it would be very difficult to get a military officer to try it. In implements of war simplicity is of the first importance.—EDS.

Fig. 1

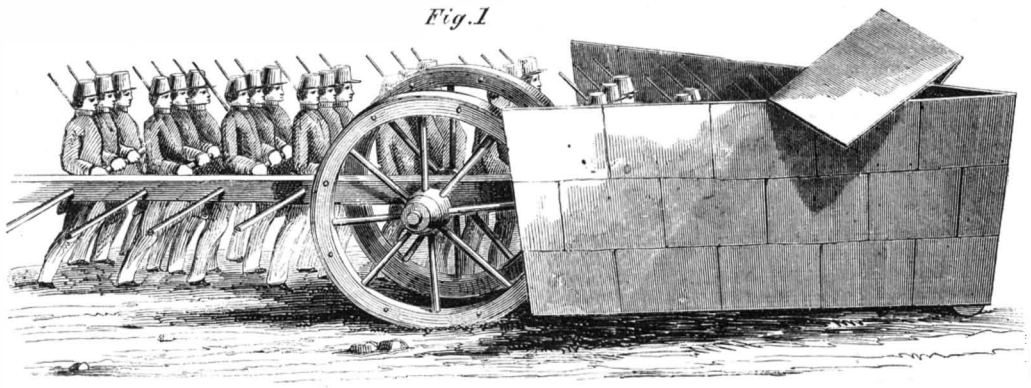
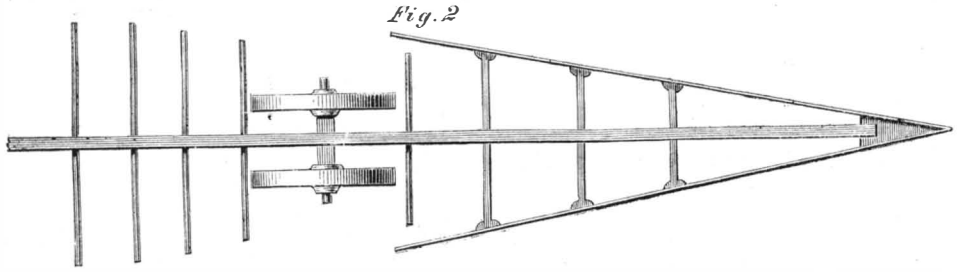


Fig. 2



INFANTRY SHIELD.

DAGUERREOTYPING COLORS.—It has long been a chief object among daguerreotypists to reproduce colors by the camera and render them permanent. With that attained, the art would reach a degree of perfection that would enable the operator to transcribe a landscape with all its natural tints and colors, or take a picture of any other object more completely than can possibly be done with the brush of the most gifted painter. The Paris *Moniteur* says that the celebrated daguerreotypist, Niepce de Saint Victor, has at last discovered the secret, and that he has subjected pictures taken by his new method to the direct action of the solar rays for several hours, without any visible change in the tints. Blue, yellow and green are said to be copied vividly. The French paper, however, does not give any explanation of the process.

Invention of the Spinning Jenny.

The following beautiful anecdote is related of Hargraves, the inventor of the Spinning Jenny :—

The invention had long engaged his attention, when one day he was observed to drop suddenly upon his knees, and roll on the stone floor at full length. He lay with his face toward the floor, and made lines and circles with the end of a burnt stick. Then he sat upon a chair and placed his head between his hands, his elbows on his knees, and gazed intently ont he floor; then he sprang to his feet, and replied to some feeble question of his wife— who had not risen since the day she gave birth to a little stranger—by a loud assurance that he had it; and taking her in his sturdy arms in the blankets, the baby in her arms, he lifted her out and held her over the black drawings on the floor. These he explained, and she joined a small, hopeful, happy laugh, with his high-toned assurance that she should never again toil at the spinning wheel—that he would never again "play," and have his loom standing for want of weft. She asked some questions, which he answered, after seating her in the arm chair, by laying her spinning-wheel on its back, the horizontal spindle vertically, while he made the wheel revolve, and drew a roving of cotton from the spindle into an attenuated thread. "Our fortune is made," he said, speaking of his drawings on the floor. "What will you call it?" asked his wife. "Call it? What an we call it after thyself, Jenny? They called thee 'Spinning Jenny' afore I had thee, because thou beat every lass in Stanehill Moor at the wheel. What if we call it 'Spinning Jenny?'"

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